This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

INDEX

ANNEX

ANNEX

ANNEX

WONDERS OF THE WORLD
NATURE
ART
AND MIND
NEW YORK

THE NEW
PUBLIC LIBRARY

ASTOR, LENOX AND
TILDEN FOUNDATIONS

THE

WONDERS OF THE WORLD,

IN

NATURE, ART, AND MIND;

COMPRISING

A COMPLETE LIBRARY

OF

USEFUL AND ENTERTAINING KNOWLEDGE;

ILLUSTRATED WITH

SEVERAL HUNDRED ENGRAVINGS;

CONSISTING OF

VIEWS OF CITIES, CELEBRATED EDIFICES, AND OTHER GREAT WORKS OF ARCHITECTURE, MONUMENTS, MECHANICAL INVENTIONS, RUINS, ILLUSTRATIONS OF THE MANNERS AND COSTUMES OF DIFFERENT NATIONS, VOLCANOES, CATARACTS, EARTHQUAKES, CAVERNS, CURIOSITIES, TREES, BEASTS, BIRDS, FISHES, REPTILES, ETC., ETC.

CAREFULLY COMPILED BY

ROBERT SEARS,

FROM THE BEST AND LATEST SOURCES.

NEW YORK:

PUBLISHED BY ROBERT SEARS, No. 122 NASSAU STREET,

J. S. REDFIELD, CLINTON HALL, CORNER OF NASSAU AND BEEKMAN STREETS.

CHARLESTON, S. C.: SILAS HOWE, 52 BROAD STREET.

ST. JOHN, N. B.: G. & E. SEARS. HALIFAX, N. S.: JOSEPH GRAHAM.

AND SOLD BY BOOKSELLERS GENERALLY, AND THE PUBLISHERS' AUTHORIZED AGENTS THROUGHOUT THE UNITED STATES AND BRITISH PROVINCES.

MDCCCXLIII.

215137
ASTOR, LENOX
TILDEN FOUNDATIONS.
1902

Entered, according to Act of Congress, in the year 1842,
By R. SEARS and J. S. REDFIELD,
in the Clerk's Office of the District Court of the United States for the Southern District of New York.

NEW YORK
PUBLIC
LIBRARY

STEREOTYPED BY REDFIELD AND SAVAGE,
13 Chambers street, N. Y.
JAMES EGBERT, PRINTER.

PREFACE.

THE title-page of this work is so full and explicit, that but few words are necessary by way of preface. The Editor flatters himself that the reader in its perusal will find his expectations answered, both with regard to ENTERTAINMENT and INSTRUCTION. If the great variety of subjects treated of can recommend any performance, ours has certainly, to say the least, equal merit to any, of its size and price, that has yet appeared in the world. How the different subjects have been handled, must be left to the reader's judgment. It is not known that a similar attempt has heretofore been made, to bring together so wide a range of information from every department of USEFUL KNOWLEDGE. For comprehensiveness of plan, therefore, the "WONDERS OF THE WORLD" stands alone, and without a rival in this book-making age!

The work, however, claims not to be faultless. It would be singular indeed, if in a thousand different articles, taken from twice that number of sources, there should be no deficiencies, mistakes, or positive errors. Besides, it is not improbable that we may have omitted several subjects, which some may rank among the greatest "WONDERS OF THE WORLD," and inserted others which they may reckon trifling, and unworthy of a place in a curious collection.

The great number of beautiful Engravings with which this volume is adorned will be a great recommendation of it, as YOUNG PEOPLE, more especially, are delighted with things of this nature, and thereby induced to read. They not only embellish and ornament the book, but convey a livelier and more correct idea of many of the objects mentioned than could be given by any verbal description.

We believe, therefore, that in compiling and as-

sembling so many objects of wonder and delight, we have conferred a real benefit, especially on the rising generation; and that the countenance and patronage of an enlightened community will be such as to cheer us onward in the preparation of other works of a similar design and character, for the general diffusion of USEFUL KNOWLEDGE among all classes. It is our sincere prayer and desire that this volume may carry the light of KNOWLEDGE and TRUTH wherever it may go. The success of the undertaking, however, will be the measure of its utility. It is now commended to the public, in the belief, that so far as it is worthy of their acceptance, it will be sufficiently well received. And if it should prove otherwise, we do not know that we shall have occasion to regret the labor and expense we have bestowed upon it.

NEW YORK
PUBLIC
LIBRARY

TABLE OF CONTENTS.

CATARACTS.

	Page.
The Falls of Niagara—Frontispiece	13
Falls of Montmorency	18
Trenton Falls, New York	18
Wilberforce Falls	20
The Falls of St. Anthony	22
The Waterfall at Puppanassum	23
Falls of the Clyde	25

VOLCANOES.

Cotopaxi	27
Stromboli	30
Island of Volcano	30
The Phase of Paroxysmal Violence	31
Vesuvius	32
Etna	34
Hecla	35
Destruction of Herculaneum and Pompeii	36
Eruption of the Tomboro Mountain in Java	38

SUB-AQUEOUS VOLCANOES.

St. Michael's Volcano	40
Crater of Kirauea	43

EARTHQUAKES.

Earthquake in Calabria	48
The Great Earthquake in 1755	50
Earthquake at Jamaica	58
Earthquakes in Sicily	60
Earthquakes in South Carolina	67
Earthquakes in South America	67
Earthquake in the Island of Hayti	71

CAVERNS.

Kingston Cave	74
Cavern of the Guacharo	75
Weyer's Cave, Va.	77
The Grotto of Antiparos	86
Gal's Cave	93
Gallic Formations	96
Great Cavern in Schoharie Co. New York	97
Stupendous Cavern at Watertown, New York	100
Cavern at Trenton Falls, New York	101
Extraordinary Cavern in Georgia	103
The Great Cave of Indiana	104
Remarkable Chasm	106

ATMOSPHERIC PHENOMENA.

Formation of Clouds	107
The Atmosphere	109
Waterspouts and Whirlwinds	112
The Rainbow of Iris	113
Atmospherical Phenomena of the Parhelia or Mock Suns	117
Meteors of 1833	118
The Spectre of the Brocken	120
Aurora Borealis	123

ASTRONOMY.

Appearance of the Heavens	125
Telescopic appearance of the Moon	128
The Copernican System	130
Variations of the Seasons	131

ANIMALS.

The Elephant	134
Lion Hunt in India	136
The Lion	139
The Tiger	141
The Leopard	145
The Panther	148
The Rhinoceros	150
The Hippopotamus	152
The Buffalo	155
The Bison or Gayal	158
The Yak	158
The Brahminy Bull	159
The Giraffe	160
The Wolf	162
The Cachemire Goat	165
The Gnu	167
The Gems-Bok	169
Ceylon Elk	171
The Zebra	172
The Wild Boar	173
The Opossum	175
The Helamys	178
The Orang Outang	178
The Chimpansee	184
The Chinchilla	187

PAGE.
The Chameleon - - - - - 190
The Raccoon - - - - - 192
The Striped Hyena - - - - 194
The Porcupine - - - - - 197
The Otter - - - - - - 198
The Beaver - - - - - 200
The Marmot - - - - - 202
The Burrowing-Owl and Prairie Dog - 205
The Mole - - - - - - 207
The Silk Worm - - - - - 209
The Hive-Bee - - - - - 212
The Hydrophilus or Water-Fiend - 215
The Argonauta - - - - - 217
The Boa Constrictor - - - - 221
The Crocodile - - - - - 223
Lizards - - - - - - 226
The Viper - - - - - - 228
The Seal - - - - - - 230
Sable Hunters - - - - - 233

BIRDS.

The Ostrich - - - - - - 235
The Emeu - - - - - - 237
Lammergeyer or Vulture of the Alps - 239
The Condor - - - - - 241
The Eagle - - - - - 245
Peregrine Falcon - - - - 246
Sea Eagle - - - - - - 251
Combatants - - - - - 253
Cotinga Ampelis - - - - 255
Hornbills - - - - - - 257
The Menura or Lyre-Tail - - - 259
Black and White Swans - - - 262
Green Brazilian Macaw - - - 265
The Oyster Catcher - - - - 267
Humming-Birds - - - - - 267
Eider Ducks - - - - - 271
Method of capturing Wild Ducks - 273
Taking of Birds' Eggs - - - 275

FISH.

Whale Fishing - - - - - 278
The Porpoise - - - - - 281
Star Fishes - - - - - 284
The Sword Fish - - - - - 286
Sea Porcupine of America - - - 288
The Sea Horse - - - - - 289
The Sting-Ray - - - - - 290

VEGETABLES.

The Vine and Vintage - - - 291
Victoria Regina - - - - - 293
Cactus - - - - - - 296
Sensitive Plant - - - - - 297
The Pitcher Plant - - - - 298
Tea - - - - - - - 299
Cotton - - - - - - 305

TREES.

Fir Trees - - - - - - 309
Catkins - - - - - - 312
Willow - - - - - - 314
Poplar - - - - - - 314
The Hornbeam - - - - - 315
The Birch - - - - - - 315
The Alder - - - - - - 315
The Chestnut - - - - - 316
The Beech - - - - - 316
Oak Plane and Hazel - - - 316
Fungi—Mushroom, Mosses, &c. - - 318
Great Chestnut Tree of Mt. Etna - 324

MISCELLANEOUS.

The Maiden's Rock, Lake Pepin on the Mississippi - - - 327
The Old Man of the Mountain - - 330
Mount Joliet, Illinois - - - - 330
Dover Stone Church - - - - 334
Snow Crystals - - - - - 336
Engraved Rocks - - - - 338
Dighton Rock in Massachusetts - - 340
Cane Brakes - - - - - 342
The Peter Botte Mountain - - - 342
Print of Human Feet in Rocks - - 344
The Siamese Twins - - - - 345
Castle Rock - - - - - 348

CITIES, PUBLIC BUILDINGS, &c.

Escurial of Spain - - - - 351
St. Peter's of Rome - - - - 359
Colossal Figure of Jupiter Pluvius - 361
Piazza del Popolo - - - - 365
Constantinople - - - - - 367
Bagdad - - - - - - 371
Alexandria - - - - - 373
Havre - - - - - - 379
Lisbon, viewed from Fort Almada - 381
Bridge of Sighs - - - - - 383
Amsterdam - - - - - 385
The Bourse—Paris - - - - 387
London - - - - - - 389
Leaning Towers - - - - 395
Caerphilly Castle, Glamorganshire - 397
Bridgenorth Castle, Shropshire - - 399
The Leaning Tower at Pisa - - 401
ARCHITECTURAL MONUMENTS - - 402
Temple of Segesta - - - - 402
Temple of Concord—Agrigentum - 404
Temple of Schoe-Madou at Pegu - - 404
Boston - - - - - - 407
Massachusetts General Hospital, Boston - - - - - - 410
Faneuil Hall, Boston - - - - 412
Capitol of Massachusetts - - - 412
Bunker's Hill Monument - - - 414
City of New York - - - - 417
New York Custom House - - - 424
Hall of Record, New York - - - 426
Statue of Hamilton - - - - 426
The New York University - - - 428
Williamsburgh, L. I. - - - 430
Albany - - - - - - 432
West Point - - - - - 435

PAGE.
The Philadelphia Exchange - - 437
Eastern State Penitentiary - - - 439
Washington Medical College, Baltimore 441
Charleston, S. C. - - - - - 443
United States Seat of Government - 446
Arcade in Providence, R. I. - - 450
Monumental Church at Richmond, Va. - 452
Treaty of William Penn - - - 454
Bridge over the River La Plata - - 454
Chain Bridge in China - - - 456
The Bridges of China - - - 458
Chain Bridge over the Potomac - - 459
The Great Wall of China - - - 461
The Mariner's Compass - - - 463
An Indian Gazette - - - - 464
The Telescope - - - - - - 466
The Rath, or Burmese Imperial State Carriage - - - - - - 468

MANNERS, CUSTOMS, COSTUMES, &c.

The Bedouins - - - - - - 472
The Kirghiza Cossacks - - - 475
PAGE.
The Hindoos - - - - - - 480
The Koords - - - - - - 481
Mahmoud II. - - - - - - 482
The Last of the Mamelukes - - 486
Dress of the Mooslim Egyptians - - 488
The Hollontontes - - - - 492
A Chinese Wedding - - - - 493
Russian Costumes - - - - 496
Bullfights - - - - - - - 499
Madagascar - - - - - - 502
Chinese Ropemaking - - - - 503
Chinese Bookseller - - - - 503
Indian Jugglers exhibiting tamed Snakes - - - - - - 505
Manners of the Northern Indians - 507
Indian Child's Grave - - - - 512
Catching Wild Horses in a Prairie - 514
Italian Mendicant - - - - 518

THE DRUIDS.

Druidical Temple near Keswick - - 519
Stonehenge - - - - - - 524
Druids' Altar, Island Magee - - - 528

LIST

OF THE PRINCIPAL ENGRAVINGS.

	Page.
Frontispiece—The Falls of Niagara	
Engraved Title Page	
Falls of Montmorency	18
Wilberforce Falls	21
The Waterfall at Puppanassum	24
View of Corra Linn	26
Cotopaxi	28
Stromboli	29
Island of Volcano	30
Vesuvius	32
Naples—its Bay and Mount Vesuvius	33
Etna	34
Hecla	35
Graham Island	42
Volcano of Jorullo	42
Ruins of the Cathedral of Lisbon	51
Interior of the Opera House in Lisbon	53
The ruins of St. Paul's	56
View of the City of Catania	59
Fissure near Polistena	61
Circular Hollows in the Plains of Rosarno	62
Ruins of Messina	64
Remains of the Temple of Serapis at Puzzuoli	66
Kingston Cave	73
Weyer's Cave, Va.	79
The Grotto of Antiparos	87
Fingal's Cave	92
Basalt	96
Carrick-a-Rede	97
Formation of Clouds	110
Clouds	111
The Rainbow of Iris	114
Atmospherical Phenomena of the Mock Suns	116
Wonderful Phenomenon	119
The Spectre of the Brocken	121
Aurora Borealis	124
Appearance of the Heavens	126
Relative size of the Planets	127
Telescopic appearance of the Moon	129
The Copernican System	130
Variations of the Seasons	132
Use of Elephants in War	134
Tiger Hunt	137
The Lion	139
The Tiger	142
Tiger Hunting	144
The Leopard	146
The Panther	149
The Rhinoceros	151
The Hippopotamus	153
The Buffalo	156
The Bison or Gayal	157
The Yak	159
The Brahminy Bull	160
The Giraffe	161
Portrait of the Wolf	163
The Wolf	164
The Cachemire Goat	166
Gnus Fighting	168
The Gems-Bok	170
Ceylon Elk	171
The Zebra of the Plains	173
The Wild Boar	174
The Opossum	176
The Helamys	179
Portrait of an Orang Outang	181
Orang Outang	183
The Chimpansee	185
The Chinchilla	188
Six engravings of the head of ditto	189
The Chameleon	191
The Rackoon	193
The Striped Hyena	195
The Porcupine	196
The Otter	199
Beavers employed in cutting down a Cotton-tree	201
The Marmot	203
The Burrowing-owl and Prairie Dog	206
The Mole	208
Silk Worm, eleven engravings	210
The Hive-Bee, seven engravings	213
The Hydrophilus or Water Fiend	216
The Argonauta	218
A Boa destroying a Tiger	220
The Indian Boa	222
The Crocodile	224
Lacerta Gecko	227
Stellio Spinipes	227
Lacerta Scinus	227
Lacerta Stellio	228
Naia Haje	229
El Affah	229
Seal Hunting	231
Sable Hunting	234
The Ostrich	236
The Emeu	238
Vulture of the Alps	240

PAGE.
The Condor - - - - 242
Eagle's Nest - - - - 245
Peregrine Falcon - - - 247
Contest between a Boy and an Eagle - - - - - 249
Hawk carrying off a Leveret - 250
Sea Eagle feeding its young - - 252
Combatants - - - - 254
Cotinga Ampelis - - - - 256
Himalayan Hornbill - - - 258
The Menura or Lyre-Tail - - 260
Black and White Swans - - 263
Green Brazilian Macaw - - 266
The Oyster Catcher - - - 267
The Humming-Bird - - - 268
Bartailed Humming-Bird - - 270
Eider Ducks, male and female - 272
Method of capturing Wild Ducks - 274
Egging - - - - - - 276
Bird Catching in Scotland - - 278
Whale Fishing - - - - 279
The Porpoise - - - - 282
Star Fish - - - - - 285
Portion of a Ray, natural size - 286
The Sword Fish - - - - 287
Sea Porcupine of America - 288
The Sea Horse - - - - 289
The Sting-Ray - - - - 290
The Vine and Vintage - - - 291
Victoria Regina - - - - 294
Under side of the leaf of ditto - 295
Cactus - - - - - - 296
The Sensitive Plant - - - 297
The Pitcher Plant - - - 299
Cultivation of the Tea Plant - - 300
Gathering the leaves of the Tea Plant - - - - - - 300
Tea Plant - - - - - 301
Drying and rolling the green Tea - 302
Final process of mixing the Tea - 302
Tree Cotton—Gossypium Arboreum - - - - - - 305
Shrubby Cotton - - - - 306
Cotton - - - - - - 307
Cotton, showing a pod bursting - 307
Cotton Plant - - - - 308
The Silver-Fir - - - - 309
Pinus Orientalis - - - - 310
Pinus Larico - - - - 311
Pinus Halpensis - - - - 312
Willow, six engravings - - 314
Poplar, four engravings - - 315
Chestnut, four engravings - - 316
Plane, three engravings - - 317
Common Elm, three engravings - 318
The Mushroom - - - - 319
The Toadstool - - - - 319
Fungi, four engravings - - 320
Common Ascobolus, six engravings - - - - - - 321
Star-like Sphærobolus, five engravings - - - - - - 322
Large Shining Cecithospora, three engravings - - - - 322

PAGE.
Sycamore, ten engravings - - 323
Great Chestnut Tree of Mt. Etna - 325
The Maiden's Rock - - - 328
The Old Man of the Mountain - 331
Mount Joliet, Illinois - - - 333
Dover Stone Church - - - 335
Snow Crystals - - - - 337
Engraved Rock in the Quadi Mokattah - - - - - - 339
Dighton Rock in Massachusetts - 340
Cane Brakes - - - - 341
Peter Botte Mountain - - - 343
Print of Human Feet in Rocks - 345
The Siamese Twins - - - 346
Castle Rock - - - - 348
Escurial of Spain, with six engravings - - - - - - 350
St. Peter's at Rome - - - 358
View of St. Peter's from the East - 360
Colossal Figure of Jupiter Pluvius - - - - - - 362
Piazza del Popolo - - - - 364
View of Constantinople - - 366
Oriental Minarets - - - 369
Turkish Mosque - - - 372
View of the City of Bagdad - - 370
View of Alexandria - - - 374
Cleopatra's Needle - - - 375
Pompey's Pillar - - - - 377
Havre - - - - - - 380
Lisbon - - - - - - 382
Bridge of Sighs - - - - 384
Weighing House at Amsterdam - 386
Paris Exchange - - - - 388
View of London from the York Column - - - - - - 390
Thames Tunnel - - - - 392
St. Paul's Cathedral, London - 393
The Leaning Towers of Bologna - 396
Caerphilly Castle, Glamorganshire - - - - - - 398
Bridgenorth Castle, Shropshire - 399
Leaning Tower at Pisa - - 400
Temple of Segesta - - - 403
Temple of Concord - - - 405
Temple of Schoe-Madou at Pegu - 406
View of Boston from Dorchester Heights - - - - - 409
Massachusetts General Hospital, Boston - - - - - - 411
Faneuil Hall, Boston - - - 413
Capitol of Massachusetts - - 414
Bunker's Hill Monument - - 416
New York in 1673 - - - 420
View of New York in 1840 - - 421
New York Custom House - - 425
Hall of Record, New York - - 427
Statue of Hamilton - - - 429
New York University - - - 430
View of Williamsburgh, L. I. - 431
View of Albany - - - - 433
View of West Point - - - 436
The Philadelphia Exchange - - 438
Eastern State Penitentiary - - 440

PAGE.
Washington Medical College, Baltimore - - - - - - 442
View of Charleston, S. C. - - 444
The Capitol at Washington - - 447
The Capitol of Virginia - - 449
Arcade in Providence, R. I. - - 451
Monumental Church at Richmond, Va. - - - - - 453
Treaty of William Penn - - 455
Bridge of Hide Ropes over the River La Plata - - - - 457
Chain Bridge in China - - 458
Chain Bridge over the Potomac - 460
The Great Wall of China - - 462
The Mariner's Compass - - 463
An Indian Gazette - - - 465
Herschel's forty feet Telescope - 467
The Rath, or Burmese Imperial State Carriage - - - 469
Enlarged view of the Tee or Pinnacle 470
Bedouins - - - - - - 472
Bedouin Costume - - - - 474
Kirghiza Cossacks - - - 476
Cossack Cemeteries - - - 477
A Hindoo Grandee Smoking - - 479
The Koords - - - - - - 481
Sultan Mahmoud II. - - - 483
Hamet, the Pilot of Lord Nelson - 485

PAGE.
The Last of the Mamelukes - - 487
Men of the Middle and Higher Classes - - - - - 490
Men of the Lower Classes - - 491
The Hollontontes - - - - 492
Chinese Wedding - - - - 494
Russian Costumes - - - -
Young Girl - - - - - 496
A Milkmaid - - - - - 497
A Married Woman - - - 498
A Russian Priest - - - - 499
A Spanish Bullfight - - - 500
Native of Madagascar - - - 502
Chinese Ropemaking - - - 503
Chinese Bookseller - - - 504
Indian Jugglers exhibiting tamed Snakes - - - - - 506
Bear Hunting by the Chippeway Indians - - - - - 508
Indian Papoose - - - - 511
Indian Child's Grave - - - 513
Catching Wild Horses in a Prairie - 515
Italian Mendicant - - - 517
Druidical Temple near Keswick - 520
Gigantic Druidical Idol - - - 522
Stonehenge - - - - - 525
Altar, Cornwall, England - - 526
Altar, Island Magee - - - 527

WONDERS OF NATURE,

CONSISTING OF

CATARACTS, VOLCANOES, CAVERNS, EARTHQUAKES,
ATMOSPHERICAL PHENOMENA, ANIMALS, &c., &c.

THE

WONDERS OF THE WORLD,

&c.

CATARACTS.

NIAGARA FALLS.

[See Frontispiece.]

This is the name given to unquestionably the finest and most celebrated waterfalls in the known world. The power of language can give but a very faint and inadequate idea of their imposing grandeur and sublimity. They are situated in that part of the river St. Lawrence which runs between lakes Erie and Ontario, and is called the Niagara River. This is a part of the St. Lawrence, which is probably exceeded by no other river, except the Amazon, in its annual tribute to the ocean. It is subject to no floods, is never swollen at one season of the year, nor shrunk at another. It issues from the north-east end of Lake Erie, forms the boundary between the United States and Upper Canada, and falls into Lake Ontario. It is thirty-six miles in length, and from half a mile to a league in breadth. Lake Erie, on proceeding from which it assumes the name of Niagara, is situated upon the horizontal strata of a region elevated nearly three hundred feet above the level of the country which contains Ontario; the descent which separates the two countries is in some places almost perpendicular, and the immense declivity formed by such strata occasions both the cataract of Niagara, and the great falls of Genesee. When the river issues from Lake Erie, it is about eight hundred yards broad, and at the ferry where the traveller crosses from the American to the Canadian side, at Black Rock, two miles below Buffalo, the channel is about a mile in width; the water issues forth in a very deep and impetuous current, and the ferry-boat describes a very considerable curve before reaching the Canadian shore. Passing along the bank, you shortly arrive at Grand Island, produced by the forking of the river; each arm of the river is more than a mile in width, and the western channel forms the boundary between Canada and the State of New York. This island, nearly seven miles long, and containing between twenty and thirty thousand acres, lies within the territory of New York. Passing this and Navy Island, the stream becomes about two miles and a half wide, and at Chippewa terminates the navigation of the upper part of the Niagara, for the rapidity of the stream soon increases so considerably, that vessels cannot with safety venture any further. Goat Island, standing like a wedge in the centre of the stream, divides the river into two currents, which issue in the two great falls. Before reaching this, the traveller will observe at a distance the agitated billows,

then the white crested breakers, and at length obtains a full view of the rapid, nearly a mile in length. The first seen is the American fall, the farther extremity of the semicircle breaking in a broad white sheet of foam upon a heap of rocks below. Close by its inner extremity is a gush of water, which in any other situation would appear a considerable cascade, but here it seems only a fragment of the larger cataract separated by a small island or rock in the bed of the river. The eye then rests upon the precipitous end of Goat Island, supporting a scanty covering of earth, and crowded to the edge with pines. From the interior of a vast semicircle here formed, the spray is volumed upward in prodigious masses, which conceal at intervals portions of this scenery, and the deep hollow thunder of the cataracts is mingled with the roar of the long and angry rapid.

The most stupendous of the falls is that on the north-western or Canada side of the river, commonly called the Great or Horse-shoe fall, from its bearing some resemblance to the form of a horse-shoe. From the centre of this fall rises a prodigious cloud of mist, which travellers say can be seen at the distance of fifty miles. The Table Rock, as it is termed, affords the spectator a complete view of this fall, commanding at the same time the whole of the furious rapid above, from the first tumultuous roll of the waves, down through its foaming course, till it subsides at the middle of the curve into momentary smoothness, and then dashes below. Here also is given a more appalling impression of the horrors of the scene, as the view from the edge of the rock down into the abyss is certainly without a parallel. From the rising bank above the Table Rock, there is perhaps a better grouping of the various features of the landscape, but then one is elevated considerably above the most important objects ; a situation highly disadvantageous to powerful impression. At the foot of the precipice, one can more adequately appreciate the vastness of the foaming cataracts, their tremendous sound, the terror of the impending precipice, and the boiling of the mighty flood. In 1818, a huge mass of this rock, on which visiters had stood with careless security, fell with tremendous noise.

The astonishment excited in the mind by the vastness of the different objects here contemplated is great indeed, and persons on coming hither for the first time can scarcely collect themselves sufficiently to be able to form a tolerable conception of the stupendous scene before them. It is impossible for the eye to embrace the whole of it at once : it must gradually make itself acquainted in the first place with the component parts of the scene, each one of which is in itself an object of wonder ; and such a length of time does this operation require, that many of those who have an opportunity of contemplating the scene at their leisure for years together, have thought that every time they have beheld it, each part has appeared more wonderful and more sublime, and that it has only been at their last visit to the cataract that they have been enabled to discover all its grandeur.

Schoolcraft, in his travels, has the following interesting information, which we will quote : "What has been said by Goldsmith, and repeated by others, respecting the destructive influence of the rapids above to ducks and other water-fowl, is only an effect of the imagination. So far from being the case, the wild duck is often seen to swim down the rapids to the brink of the falls, and then fly out and repeat the descent, seeming to take delight in the exercise. Neither are small land birds affected in flying over the falls, in the manner that has been stated. I observed the blue-bird and the wren, which had already made their annual visit to the banks of the Niagara, frequently fly within one or two feet of the brink, apparently delighted with the gift of their wings, which enabled them to sport over such frightful precipices without danger."

A celebrated writer from whom we quote, describes the road leading to the bottom of the fall as beset with difficulties. After leaving the Table Rock, the traveller must proceed down the river nearly half a mile, where he will come to a small chasm in the bank, in which there is a spiral staircase enclosed in a wooden building. By descending this stair, which is seventy or eighty feet perpendicular height, he will find himself under the precipice on the top of which he formerly walked. A high but sloping bank extends from its base to the edge of the river; and on the summit of this there is a narrow, slippery path, covered with angular fragments of rock, which leads to the great fall. The impending cliffs, hung with a profusion of trees and brushwood, overarch the road, and seem to vibrate with the thunders of the cataract. In some places they rise abruptly to the height of one hundred feet, and display upon their surfaces fossil shells and the organic remains of a former world; thus sublimely leading the mind to contemplate the convulsions which nature has undergone since the creation. As the traveller advances, he is frightfully stunned by the appalling noise; clouds of spray sometimes envelope him, and suddenly check his faltering steps; rattle-snakes start from the cavities of the rocks, and the scream of eagles soaring among the whirlwinds of eddying vapor which obscure the gulf of the cataract, at intervals announce that the raging waters have hurled some bewildered animal over the precipice. After scrambling over piles of huge rocks that obstruct his way, the traveller gains the bottom of the fall, where the soul can be susceptible only of one emotion,—that of fear.

A little below the great fall, the river is, comparatively speaking, so tranquil, that a ferry-boat plies between the Canada and American shores for the convenience of travellers. On reaching the middle, the attention is engaged by the surpassing grandeur of the scene. Within an area of a semicircle of cataracts, more than three thousand feet in extent, and floated on the surface of a gulf, raging fathomless and interminable, majestic cliffs, splendid rainbows, lofty trees, and columns of spray, were the gorgeous decorations of this theatre of wonders; while a dazzling sun shed refulgent glories upon every part of the scene. Surrounded with clouds of vapor, and stunned into a state of confusion and terror by the hideous noise, the traveller looks upward to the height of one hundred and fifty feet, where are vast floods, dense, awful, and stupendous, volcanically bursting over the precipice, and rolling down as if the windows of heaven were opened to pour another deluge upon the earth. Loud sounds, resembling discharges of artillery or volcanic explosions, are distinguishable amid the watery tumult, and adding terror to the abyss from which they issued. The sun looking majestically through the ascending spray, was encircled by a radiant halo; while fragments of rainbows floated on every side, and momentarily vanished only to give place to a succession of others more brilliant. Looking backward, the Niagara river is calm and tranquil, rolling magnificently between the towering cliffs that rise on either side, and receiving showers of green dew-drops from the trees that gracefully overarch its transparent bosom.

The American fall is a most beautiful sheet of water, and well worthy to hold the rank of the second wonder of the world of this kind; although it cannot be compared to the Horse-shoe fall in grandeur and sublimity. It is about one hundred and fifty or two hundred yards in breadth; and either from its rocky bed being composed of harder materials, or from the greater weight of water running down the Canadian side and wearing away that channel more rapidly, it is about twenty feet higher than the Horse-shoe. It does not fall into a gulf or vortex as the other does, but among huge rocks, where it dashes itself into an ocean of foam, and then rushes with tremendous velocity to join

its former companion. Here there is a wooden staircase, by which the most nervous and timid person may descend to the bottom of the cataract with ease and safety.

The height of the great fall, as taken with a plumb-line by some engineers from the United States, was found to be one hundred and forty-nine feet. Its curve is supposed to extend two thousand one hundred feet, and its arc may measure nearly half that space. The breadth of Goat Island, which divides the two cataracts, has been found to be nine hundred and eighty-four feet, and that of the American fall eleven hundred and forty feet. Therefore, the whole circumference of the precipice over which the cataracts fall is four thousand two hundred and twenty-four feet, and the width of the cataract itself is three thousand two hundred and forty feet. At one time, the Table Rock extended fifty feet beyond the cliffs that support it, but its projection is not so great at present.

The quantity of water that falls is estimated at a hundred millions of tuns in an hour; hence it might be thought that the current for miles would be impassable for a small boat. It seems almost incredible, were not the fact decisively proved, that immediately below such an immense rush of waters, the surface should be sufficiently tranquil to allow a boat to pass across the stream with ease; but, what is still more extraordinary, there is a current of back water on the American side of the river running *toward* the main fall. The explanation given by persons residing on the spot, is, that the depth of the river exceeds one hundred and seventy feet, and that the water from the falls sinks beneath, and forms an under current, which, in its progress, dashing against the rocks at the bottom, causes the waters to rise in different parts in circular heaps to the surface, and forms the back current. Indeed, so comparatively tranquil is the creamy surface, that boats often advance to the very base of the falls.

There have been several instances of people having been carried over them, but none of the bodies were ever found. The rapidity of the river before it tumbles down the precipice is so great that a human body would certainly be whirled along without sinking, and hence some of these individuals probably retained their senses till they reached the edge of the cataract, and even looked down upon the gulf into which they were the next moment precipitated.

That the falls of Niagara were at one time lower down the river than they are at present, is a fact that can be proved by reason and observation. The rapidity with which the continual attrition of so large a body of water wears away the hardest rocks is known to every one, and has been exemplified in the changes which Niagara falls have undergone, both in form and position, during the short time they have been under the observation of civilized beings. Most of the oldest inhabitants agree in their statements respecting the alteration which has taken place in the shape of the Great or Horse-shoe cataract within their recollection.

A cursory glance at what is now taking place at the falls leaves not a doubt that the great cause of the comparatively quick retrograde movement of the falls, is the loose and soft material on which the limestone rock rests, and the destructive action of the water upon it. The water, also penetrating the crevices between the strata of solid limestone, detaches them from each other and disposes them to fall. At present, the limestone rock projects considerably over the shale at the falls, and it is this projection which makes it practicable to pass between the water and the rock, nearly half way under the Horse-shoe fall.

The falls could not possibly have been further down the river than Queenstown, a distance of seven miles, for the pitch or elevation which occasions them

begins there, and is called the mountain. That their site was at this place seems highly probable from several circumstances. The precipices which form the two sides of the river have a close resemblance to each other in form and outline, and the elevations of their respective strata exactly correspond. The cliffs in many places bear distinct marks of the agency of water, sixty or seventy feet above the present level of the river. It may perhaps be said that this deep chasm or channel, through which the river runs on its descent, was a rent made by an earthquake. This supposition would avail if the strata were deranged, but the reverse is the fact. The strata on each side are parallel and on the same level, and bear evident marks of the action of some powerful instrument having cut through them in a perpendicular direction; and that instrument was water. The wall-like appearance of the rocks on each side of the river is precisely the same at the falls as at the commencement of the chasm at Queenstown. At the ferry, the river is at least one hundred feet deeper than anywhere below; and there the basin of the cataracts must have been originally, if ever they were so far below their present situation.

The disintegration of the rocks must continue until the falls reach Lake Erie, provided the present causes continue to operate. In the course of a few centuries, Goat Island, which now separates the falls, by the wearing away of the rocks, will be isolated in the midst of the fallen flood, as a colossal pillar carved by the resistless hand of Nature, and a splendid and astonishing monument, from which posterity, by turning to the records of the present day, may learn what progress the cataracts have made toward Lake Erie within a certain period of time. When, crab-like, they have worked their way through twenty miles of rock, and reached the mouth of this lake, if it be allowable even to speculate upon such an event, a total change will take place in their form. The largest body of water being always toward the centre of the cataract, will, by its comparatively greater attrition, make the precipice assume a concave form similar to what it has at present in the great fall—and as Lake Erie is not confined within a narrow channel like the Niagara river, but extends over a large surface, its waters will not be forced over the precipice in a body, but will continue to cover nearly the same space that they occupy at present near its mouth —and thus form a cataract of immense width. But these are only speculations, for Nature in her vast laboratories, throughout a series of ages, has proceeded onward, resistless and rapid, though insensibly so. From the remotest periods in the earth's physical history recognisable by man to the present time, the mechanical and chemical laws which govern inorganic matter appear to have undergone no change. The wasting away of the solid rocks by water, and the subsequent deposition and consolidation of the detritus; the subsidence of the dry land beneath the sea, and the elevation of the ocean bed into new islands and continents; the decomposition of animal and vegetable substances on the surface, and their conversion into stone or coal; the transmutation of mud and sand into rock, and of earthy minerals into crystals,—are physical changes that have been going on through all time.

It is highly probable that the Lakes Superior, Michigan, Huron, and Erie, were once united, and formed one vast inland sea, which poured its waters down the Missouri and Mississippi into the ocean; even at present some of the branches of the former river (in high floods) interlock with the rivers that run into Lake Superior. The abrupt termination of the table land at Queenstown would indicate a subsidence of the country round what is now Lake Superior; such a subsidence would explain existing circumstances, and teach us that all these changes are under the influence of those immutable laws established by Divine Providence for the maintenance and renovation of the material universe.

FALLS OF MONTMORENCY.

Among the many attractions which are presented to the traveller in America, the different falls are not the least interesting. The falls of Niagara are celebrated throughout the civilized world, as one of the grandest and the most sublime spectacles to be found in the universe. Among falls of a secondary character, the falls of Montmorency deserve notice; and although the scenery around them is by no means as impressive as at Niagara, yet the true lover of nature—he who looks with the eye of an enthusiast upon the sublime and the beautiful, as it came from the hand of the Creator—can spend many an hour of pleasure and delight in watching the Montmorency, as it comes rushing and thundering down the steep precipice, sending forth its rainbows of light spray, in token of joy that the rough way is passed over, and that its waters may afterward roll on in peace and quiet.

The falls of Montmorency are situated in the river of the same name, distant from six to seven miles below Quebec. The river shoots in a sheet over a vast precipice; its breadth at the top of the cascade is about one hundred feet; its perpendicular descent is about two hundred and forty feet. The banks on each side of it are smooth and precipitous; their summits are crowned with trees, while a mill is perched high upon the verge of the fall.

TRENTON FALLS, N. Y.

Captain Marryatt thus describes his visit to these Falls:—A tremendous thunder-storm, with torrents of rain, prevented my leaving Utica for Trenton Falls until late in the afternoon. The roads, ploughed up by the rain, were any thing but democratic; there was no level in them; and we were jolted and shaken like peas in a rattle, until we were silent from absolute suffering. I rose the next morning at four o'clock. There was a heavy fog in the air, and

you could not distinguish more than one hundred yards before you. I followed the path pointed out to me the night before, through a forest of majestic trees, and descending a long flight of steps, found myself below the Falls. The scene impressed me with awe—the waters rushed through deep chasms, between two walls of rock, one hundred and fifty feet high, perpendicular on each side, and the width between the two varying from forty to fifty feet. The high rocks were of black carbonate of lime in perfectly horizontal strata, so equally divided that they appeared like solid masonry. For fifty or sixty feet above the rushing torrent they were smooth and bare; above that line vegetation commenced with small bushes, until you arrive at their summits, which were crowned with splendid forest trees, some of them inclining over the chasm, as if they would peep into the abyss below and witness the wild tumult of the waters.

From the narrowness of the pass, the height of the rocks, and the superadded screening of the trees above, but a small portion of the heavens was to be seen, and this was not blue, but of a misty, murky gray. The first sensation was one of dismayness and confusion, from the unusual absence of the sky above, and the dashing, frantic speed of the angry boiling waters. The rocks on each side have been blasted so as to form a path by which you may walk up to the foot fall; but this path was at times very narrow, and you have to cling to the chain which is let into the rock. The heavy storm of the day before had swelled the torrent so that it rose nearly a foot above this path; and before I had proceeded far, I found that the flood swept between my legs with a force which would have taken some people off their feet. The rapids below the Falls are much grander than the Falls themselves; there was one down in a chasm between two riven rocks, which it was painful to look upon, and watch with what a deep plunge—what irresistible force—the waters dashed down and then returned to their own surface, as if struggling and out of breath. As I stood near them in their wild career, listening to their roaring as if in anger, and watching the madness of their speed, I felt a sensation of awe—an inward acknowledgment of the tremendous power of Nature; and after a time, I departed with feelings of gladness to escape from thought which became painful when so near to danger.

I passed the lower falls, which now covered the whole width of the rock, which they seldom do except during the freshets. They were extraordinary for their variety. On the side where I stood, poured down a rapid column of water about one half the width of the fall; on the other it was running over in a clear, thin stream, as gentle and amiable as water could be. That part of the fall reminded me of ladies' hair in flowing ringlets, and the one nearest me of the Lord Chancellor Eldon, in all the pomposity and frowning dignity of his enormous wig. And then I thought of the lion and the lamb, not lying down, but falling down together; and then I thought I was wet through, which was a fact, so I climbed up a ladder, and came to a wooden bridge above the fall, which conveyed me to the other side. The bridge passes over a staircase of fifty steps, sometimes diagonally, sometimes at right angles, with the sides, and is very picturesque.

On the other side you climb up a ladder of one hundred feet, and arrive at a little building with a portico, where travellers are refreshed. Here you have a view of all the upper falls, but these seem tame after witnessing the savage impetuosity of the rapids below. You ascend another ladder of one hundred feet, and you arrive at the path pointed out to you by the broad chip of the madman's axe. Follow the chips, and you will arrive four or five feet above the bridge and the level of the upper fall. This scene is splendid. The high perpendicular rocks on the other side; the succession of falls; the

rapids roaring below; the forest trees rising to the clouds and spreading with their majestic boughs; the vapor ascending from the falling waters; together with the occasional glimpses of the skies here and there—all this induces you to wander with your eyes from one point of view to another, never tiring with its beauty, wildness, and vastness; and if you do not exclaim with the Mussulman, God is great! you *feel* it through every sense, at every pulsation of the heart.

The mountain was still above me, and I continued my ascent; but the chips now disappeared, and like Tom Thumb, I lost my way. I attempted to retreat, but in vain: I was no longer among forest trees, but in a maze of young mountain ash, from which I could not extricate myself, so I stood still to think what I should do. I recollected that the usual course of proceeding on such occasions, was either to sit down and cry, or attempt to get out of your scrape. Tom Thumb did both; but I had no time to indulge in the former luxury, so I pushed and pushed, till I pushed myself out of the scrape, and I found myself in a more respectable part of the woods. I then stopped to take breath. I heard a rustling behind me, and made sure it was a panther—it was a beautiful little palm squirrel, who came close to me, as if to say, "Who are you?" I took off my hat and told him my name, when very contemptuously, as I thought, he turned short round, cocked his tail over his back, and skipped away. "Free, but not enlightened," thought I; "hasn't a soul above nuts." I also beat a retreat, and on my arrival at the hotel, found that, although I had no guide to pay, Nature had made a very considerable levy upon my wardrobe; my boots were bursting, my trousers torn to fragments, and my hat was spoiled; and moreover, I sat shivering in the garments which remained. So I, in my turn, levied on a cow that was milking, and having improved her juice very much by the addition of some rum, I sat down under the portico, and smoked the cigar of meditation.

The walls of the portico were, as usual, scribbled over by those who would obtain cheap celebrity. I always read these productions; they are pages of human life. The majority of the scribblers leave a name and nothing more; beyond that, some few of their productions are witty, some sententious, mostly gross

---

WILBERFORCE FALLS.

[See page 21.]

THE Arctic regions abound in grand and sublime scenery. Few objects in nature can be more magnificent than the Falls of Wilberforce, in the Hood River; of which we subjoin a copy of the engraving from CAPTAIN BLACK's spirited drawing. They are thus described by Captain Franklin.

"We pursued our voyage up the river, but the shoals and rapids in this part were so frequent, that we walked along the banks the whole day, and the crews labored hard in carrying the canoes thus lightened over the shoals, or dragging them up the rapids; yet our journey in a direct line was only about seven miles. In the evening we encamped at the lower end of a narrow chasm or rent in the rocks, through which the river flows for upwards of a mile. The walls of this chasm are upwards of two hundred feet high, quite perpendicular, and in some places only a few yards apart. The river throws itself into it over a rock, forming two magnificent and picturesque falls close to each other. The upper fall is about sixty feet high, and the lower one at least one hundred, but perhaps

WILBERFORCE FALLS.

considerably more; for the narrowness of the chasm into which it fell prevented us from seeing its bottom, and we could merely discern the top of the spray far beneath our feet. The lower fall is divided into two, by an insulated column of rock which rises about forty feet above it. The whole descent of the river at this place probably exceeds two hundred and fifty feet. The rock is very fine sandstone. It has a smooth surface, and a light red color. I have named these magnificent cascades 'Wilberforce Falls,' as a tribute of my respect to that distinguished philanthropist and Christian. Messrs. Back and Hood took beautiful sketches of this majestic scene, which are combined in the annexed plate."

THE FALLS OF ST. ANTHONY.

The falls of St. Anthony are fourteen miles below the confluence of the Mississawgaeigon. We reached the upper end of the portage at half past eight in the morning, and while the voyagers were busy in the transportation of our baggage, hastened to take a view of this celebrated cataract. The river has a perpendicular pitch of forty feet, with a formidable rapid above and below. An island at the brink of the falls divides the current into two sheets, the largest of which passes on the west of the island. The rapid below the chute is filled with large fragments of rocks, in the interstices of which some alluvial soil has accumulated, which nourishes a stinted growth of cedars. This rapid extends half a mile, in which distance the river may be estimated to have a descent of fifteen feet. The rapid preceding the falls has a descent of about ten feet in the distance of three hundred yards, where the river runs with a swift but unruffled current over a smooth stratum of rock a little inclined towards the brink. The entire fall, therefore, in a little less than three quarters of a mile, is sixty-five feet. The rock is a white sand-stone, overlaid by secondary limestone. This formation is first seen half a mile above the falls, where it breaks out abruptly on the banks of the river. The perspective view is taken from a point about two hundred yards below the chute of the falls on the east shore, and a short distance west of the portage path. The scene presents nothing of that majesty and awe which is experienced in the gulf below the cataract of Niagara. We do not hear that deep and appalling tone in the roar of water, nor do we feel that tremulous motion of the rocks under our feet, which impresses the visiter at Niagara with an idea of *greatness*, that its magnificent outline of rock and water would not, independently, create. The falls of St. Anthony, however, present attractions of a different nature, and have a simplicity of character which is very pleasing. We see nothing in the view which may not be considered either rude or picturesque, and perhaps there are few scenes in the natural topography of our country where these features are blended with more harmony and effect. It is in fact the precise point of transition, where the beautiful prairies of the upper Mississippi are merged in the rugged lime-stone bluffs which skirt the banks of the river from that point downward. With this change of geological character, we perceive a corresponding one in the vegetable productions, and the eye embraces at one view the copses of oak upon the prairies, and the cedars and pines which characterize the calcareous bluffs. Nothing can exceed the beauty of the prairies which skirt both banks of the river above the falls. They do not, however, consist of an unbroken plain, but are diversified with gentle ascents and small ravines covered with the

most luxuriant growth of grass and heath-flowers, interspersed with groves of oak, which throw an air of the most picturesque beauty over the scene.

It is probable, too, that during the high floods of the Mississippi in the spring and fall, this cataract attains a character of sublimity, from the increased volume and tumult of the water, and the inundation of the accumulated débris, which presents at this season so rugged an aspect. It is said, also, that this accession of water produces a cloud of spray which must take away a certain nakedness in the appearance of the falls, that will strike every visiter who has previously enjoyed the sight of the Niagara.

The European name of these falls is due to Father Lewis Hennepin, a French missionary of the order of Recollects, who first visited them in 1680. The Indian name in the Narcotah or Sioux language is *Owah-menah*, or the falling water.—*Schoolcraft's Travels.*

THE WATERFALL AT PUPPANASSUM.

[See page 24.]

Before we left Tinevelly, we took the opportunity of visiting the waterfall at Puppanassum, which is, perhaps, upon the whole, the most stupendous object of its kind in the Carnatic. The approach to it lay through a long narrow valley, at the termination of which the fall deposites its waters in an unfathomable pool whence a new river seems to issue, winding its placid course through a plain nearly level with the sea. Upon our approach to the fall through this valley, confined on either side by lofty hills, the view of it was frequently obstructed by the intersections of the mountain round which we occasionally had to wind. We followed the tortuous course of the stream, along the banks of which we saw a great number of devotees on their way to bathe in those sacred waters, and to offer their geauflexions and prostrations upon a spot, consecrated at once by extreme antiquity, and very awful local traditions. These slaves of the most besotted superstitions upon earth, did not appear to be at all pleased at the idea of seeing the place profaned by the unhallowed feet of *faringees*, or Christians, whom they hold in absolute abhorrence. They passed us in dogged silence, and there was an expression of malignant scorn upon the curl of those lips, which were about to offer up their devotions to gods more abominable than themselves, that satisfied us they wanted not the will, though they lacked the daring, to do us a mischief. Alas! that devotion should have such votaries! No one who has witnessed the stern ferocity of feeling encouraged by the deluded supporters of a most extravagant idolatry, towards all of a different creed, can well shut out the reflection of his own moral advantages, and fail to bless his God, with most earnest sincerity of purpose, that he was born a member of a Christian community.

Upon turning the angle of a hill, which rose abruptly from the valley, the fall burst suddenly upon our sight. It was indeed a magnificent spectacle. The impression excited was so uncommon, that I was obliged to close my eyes for a moment, in order to recover from the sudden and almost astounding surprise. Though the roar of the cataract had been long heard before we reached it, so that we were not unprepared for something more than commonly imposing, the reality far transcended our expectations. It is precipitated from a height of one hundred and fifty feet, pouring over the steep a prodigious body of water, which, forcing its way betwixt intervening rocks, among which it boils and hisses with tremendous energy, falls into the deep, dark pool beneath, with a

THE WATERFALL AT PUPPANASSUM.

fin and turbulence that are almost deafening. The sound of the cataract may be heard at the distance of several miles, even in the dry season; but, during the monsoons, when swelled by mountain torrents, the roar is augmented tenfold. There is a tremendous vortex just below the fall, caused by its sudden and violent pressure upon the surface below, so that no one can safely approach within reach of the spray. The waters of this spot are highly sacred, Puppasanam, the name which the place bears, signifying the washing away of sins. A great number of devotees are to be seen at all times bathing in this consecrated river.—*Oriental Annual.*

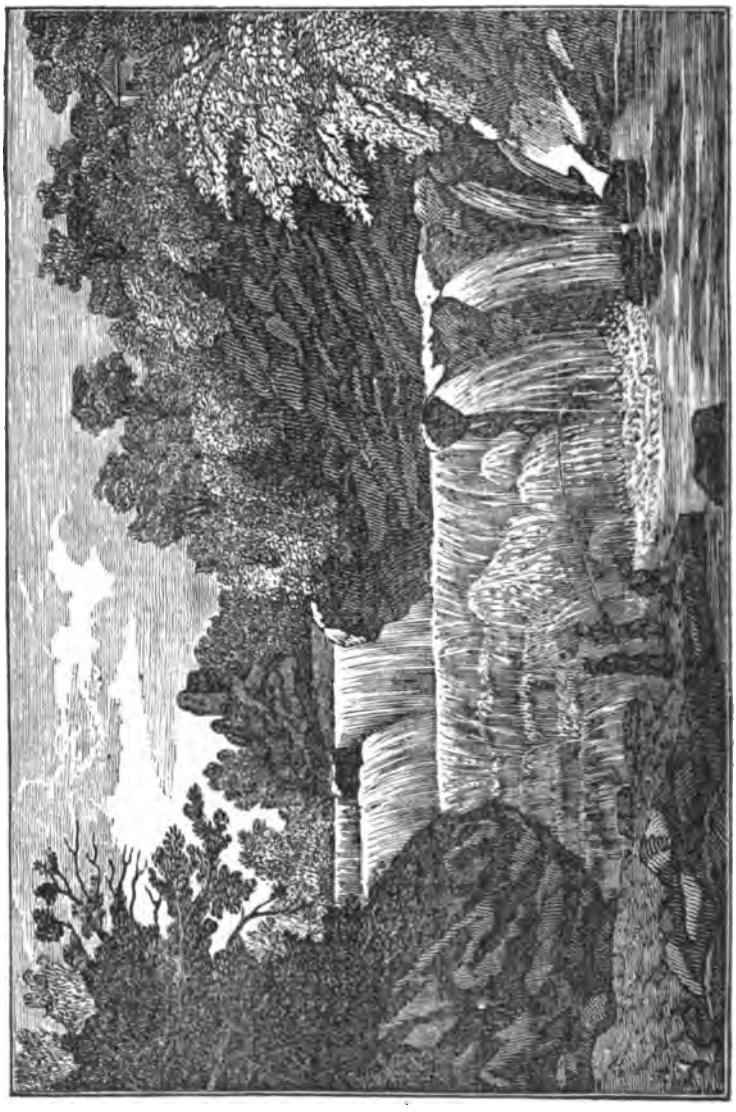
FALLS OF THE CLYDE.

(See page 30.)

THE river Clyde, in the neighborhood of the town of Lanark, presents, according to the testimony of all travellers, some of the most romantic and picturesque scenery in the world. We shall confine ourselves at present to a short notice of the Linns or falls which have been so much celebrated. The word *Linn*, we may remark, is the Gaelic *Lenn*, and signifies merely a fall or leap; its application to a cataract, or fall of water, is general throughout Scotland. Burns has introduced the word with very happy effect in his humorous and well-known song of Duncan Grey, where, in describing the perplexity and despair of the rejected suitor, he says—

> "Duncan sighed baith out and in,
> Grat his ee baith blear'd and blin',
> Spak o' lowpin' over a linn;
> Ha, ha, the wooin' o't."

"*Spak o' lowpin' over a linn*," writes one of his correspondents, the Honourable A. Erskine, to the poet, "is a line of itself that should make you immortal." Let us return to the linns on the Clyde. The first precipice over which the river rushes, on its way from the hills, is situated about two miles above Lanark, and is known by the name of Bonnington Linn. It is a perpendicular rock of some twenty, or, as some authorities state, thirty feet in height, over which the river, after having approached its brink in a broad sheet, smooth as a mirror, and embracing the forests that clothe its margin, tumbles impetuously into a deep hollow or basin, where it is instantly ground into froth. A dense mist continually hovers over this boiling caldron. From this point downward the channel of the river assumes a chaotic appearance; instead of the quiet and outspread scene above the fall, we have now a confined and angry torrent forcing its way with the roar of thunder between steep and meeting rocks, and over incessant impediments. The scenery on both sides, however, is exquisitely rich and beautiful. A walk of about half a mile, which may be said almost to overhang the river, leads to the second and most famous of the falls, that called Corra Linn, from the castle of Corra, now in ruins, which stands in its neighborhood. "The tremendous rocks around," says the report on the parish of Lanark, published in Sir John Sinclair's Statistical Account of Scotland, "the old castle upon the opposite bank, a corn-mill on the rock below, the furious and impetuous stream foaming over the rock, the horrid chasm and abyss underneath your feet, augmented by the hollow murmur of the water, and the screams of wild birds, form a spectacle at once tremendous and pleasing. A summer-house or pavilion is erected on a high rocky bank, that overlooks the linn, built by Sir James



View of Corra Linn.

Carmichael, of Bonnington, in 1708. From its uppermost room it affords a very striking prospect of the fall; for, all at once, on throwing your eyes toward a mirror on the opposite side of the room from the fall, you see the whole tremendous cataract pouring as it were upon your head. The Corra Linn, by measurement, is eighty-four feet in height. The river does not rush over it in one uniform sheet like Bonnington Linn, but in three different, though almost imperceptible precipitate leaps. On the southern bank, and when the sun shines, a rainbow is perpetually seen forming itself upon the mist and fogs, arising from the violent dashing of the waters,"—as Byron has beautifully sung of the Cataract of Velino, in Italy:—

> ——————"On the verge,
> From side to side beneath the glittering morn,
> An Iris sits amid the infernal surge,
> Like Hope upon a death-bed, and, unworn
> Its steady dyes, while all around is torn
> By the distracted waters, bears serene
> Its brilliant hues with all their beams unshorn:
> Resembling, 'mid the torture of the scene,
> Love watching Madness with unalterable mien."

A short distance below Corra Linn is another fall called Dundaff Linn, the appearance of which is also very beautiful, though it is only about three feet and a half high. About three miles further down, and a considerable way past the town of Lanark, is the last of the falls, that called Stonebyres Linn. It is a precipice, or rather a succession of three precipices, making together a height of sixty-four feet. The same general features of rugged rocks, here appearing in all their dreary bareness, there concealed by trees and shrubs, of wild birds winging their flight over the bounding cataract and mingling their screams with its roar, and of cultivated nature in its most luxuriant beauty contending all around with the sublimity of the untamed torrent, which belong to Corra Linn, mark that of Stonebyres also, though with some diminution of the romantic effect. A peculiar phenomenon which is to be seen here, is that of the incessant endeavors of the salmon, in the spawning season, to mount the lofty barrier by which they now find their migration from the sea for the first time opposed. Their efforts, it is almost needless to say, are quite unavailing. It is also stated that the horse muscle, the pearl oyster, and some other species of fish, which are found in great numbers below this fall, are never seen above it. Trouts, however, have been observed to spring up the small ascent of Dundaff Linn apparently without difficulty.

VOLCANOES.

COTOPAXI.

[See page 28.]

Our engraving represents Cotopaxi, the most remarkable volcanic mountain of the Andes, in Quito. It is the most beautiful of the colossal summits of the Andes. It is a perfect cone, which, being covered with an enormous layer of snow, shines with dazzling splendor at the setting of the sun, and stands forth in bold relief from the azure heavens. This covering of snow conceals

Cotopaxi

from the eye of the observer even the smallest inequalities of the ground. No point or mass of rock penetrates the coating of snow and ice, or breaks the exact regularity of the conical figure. The crater is surrounded by a small circular wall, which, when viewed through a telescope, appears like a parapet. Its height above the sea is 18,891 feet. It is the most tremendous volcano in Quito, and its explosions have been most disastrous, spreading destruction over the surrounding plains. Remarkable eruptions took place in 1698, 1738, 1742, 1744, 1766, and 1769; and one in 1803. In 1698, the eruption destroyed the city of Tacunga, with three fourths of its inhabitants, and other settlements. In 1738, the flames rose nearly 3000 feet above the brink of the crater; and in 1744, its roarings were heard as far as Honda, on the Magdalena. With respect to the explosion of 1803, Humboldt observes: "At the port of Guayaquil, fifty-two leagues distant, in a straight line, from the crater, we heard, day and night, the noise of this volcano, like continued discharges of a battery; and we distinguished these tremendous sounds even on the Pacific ocean." In viewing this volcano, everything contributes to give it a most awful character. The pyramidal summits of Illinissa; the snowy ridges of the other mountains; the singular regularity of the inferior line of snow, and the luxuriance of the green plains, form an unparalleled assemblage of the grand and picturesque features of nature. Humboldt found it difficult to ascend the mountain, in 1802, as far as to the limit of perpetual snow, and he pronounces it impossible, by any human art, to reach the summit. It is thirty miles S. S. E. of Quito, and 6 leagues to the N. N. E. of Chimborazo.

It is said that there are not more than three volcanoes which are in a state of permanent activity; that of Stromboli, one of the Lipari isles; the Devil's Mount, in the Lake of Nicaragua; and that in the Isle of Bourbon.

Stromboli.

Stromboli has been in a state of constant activity for more than two thousand years, and is a good type of this class. Lava seldom overflows its crater, but large masses of burning rocks and scoriæ are incessantly ejected in a perpendicular direction. This phenomenon, accompanied by a loud explosion, occurs every seven or eight minutes, of which fact we are informed by Pliny, as well as by modern travellers.

Dolomieu examined this interesting mountain, and has given the following description of its eruptions: "The inflamed crater is on the north-western part of the isle, on the side of the mountain. I saw it dart during the night, at regular intervals of seven or eight minutes, ignited stones, which rose to the height of more than a hundred feet, forming rays a little divergent, but of which the greater quantity fell back into the crater, while others rolled even to the sea."

On the following day he ascended an eminence above the crater, from which he obtained a still more interesting view. "The crater," he says, "is very small; I do not think it exceeds fifty paces in diameter, having the form of a funnel terminating in a point. During all the time I observed it, the eruptions succeeded with the same regularity as during the preceding night. The approach of the eruption is not announced by any noise or dull murmur in the interior of the mountain, and it is always with surprise that one sees the stones darted into the air. There are times when the eruption is more precipitate and violent, and stones describing more divergent rays are thrown into the sea at a considerable distance."

It has been stated by Dolomieu, Hamilton, and Scrope, on the authority of the islanders, that during the winter season the eruptions are far more violent than in summer, and that atmospheric changes may be generally predicted from the appearance of the crater. Sometimes during the storms of winter the cone is split, and large currents of lava are discharged.

Island of Volcano.

In the Island of Volcano there is a crater which at some former period must have been active, and still emits gaseous vapors, which prove the continued existence of the volcanic cause. "The operations of this volcano," says Dr. Daubeny, "exhibit perhaps the nearest approximation to a state of activity during which descent into the crater would have been practicable.

"Nor can I imagine a spectacle of more solemn grandeur than that presented in its interior, or conceive a spot better calculated to excite, in a superstitious age, that religious awe which caused the island to be considered sacred to Vulcan, and the various caverns below as the peculiar residence of the gods."

THE PHASE OF PAROXYSMAL VIOLENCE.

The phase of paroxysmal violence, or, as it is usually called, long intermission, is characterized by lengthened periods of repose, followed by violent, though transient eruptions. Baron Humboldt has stated that lofty volcanoes are always in this state. The volcanic mountains of the Andes have not, generally speaking, an eruption more than once in a century; and the peak of Teneriffe, which was active in 1798, had not at that time been disturbed for ninety-two years. It must not, however, be supposed that this volcanic condition is confined to elevated craters, for the histories of other mountains give abundant evidence of the contrary.

The phenomena which accompany eruption are nearly the same in all cases; varying in intensity, and consequently in the evidence of their effects. In some cases the phenomena and the effects are confined to the immediate neighborhood of the excited mountain; while in other instances, and it is generally the case when the mountain is in the phase of paroxysmal intensity, the effects are felt to many miles round the active cone. The explosions of Cotopaxi have been heard at a distance of six hundred miles.

The activity of a volcano generally commences with a loud detonation, which is succeeded by others less loud, and the escape of aeriform fluids. Large fragments of rock and masses of lava are usually projected by these discharges, some of which fall back into the crater and are redischarged, until they are reduced to powder, and mingle with the surrounding atmosphere of heated air. The accumulation of these particles produces the appearance of dense clouds of smoke, which are almost invariably seen to surround the summit of the crater.

The lava then rises in the vent of the mountain, and finds an egress from the crater, or from some lateral opening. In some cases, however, scoriæ alone are projected. During the day, the lava is generally hidden by the aqueous vapors which arise from it, but at night it appears of a glowing heat. While the lava continues to flow, the detonations are frequently less violent; but there is no proof of the termination of the paroxysm until the mountain ceases to spout; and even then peace is not immediately restored, for scoriæ and masses of rock are often thrown out for some time after the dreadful crisis is past.

When the detonations become less frequent, rumbling sounds are heard, as the roaring of mighty waters; and the mountain seems gradually to yield to exhaustion, or sinks into a state of partial rest, occasionally disturbed by explosions, and the ejection of scoriæ. Toward the conclusion of an eruption, that is, after the lava has ceased to flow, the surrounding country is frequently enveloped in dark clouds of black-colored sand, or a white comminuted pumice.

The lofty mountains seldom eject lava from their summits, but from lateral openings; for it requires far less power to open a passage in the side of the mountain than to elevate the intumescent mass to the summit. In the last eruption of Teneriffe, a lateral opening was formed; and, according to a calculation by M. Dufrénoy, it would have required a force equivalent to a thousand atmospheres, to raise a mass of lava to the elevated crater of the mountain.

We may now adduce a few examples of activity in the phase of paroxysmal violence; and the difficulty is, not to find a characteristic type, but to choose from the many authenticated and interesting details that are to be found in the pages of philosophical records.

Teneriffe was in this phase in the year 1794. The first proof of the approach of the dreadful eruption which happened at this time, was during the night of the 22d of June, when a severe shock of an earthquake was felt at

Naples, and over the surrounding country. Nothing more occurred to rouse the fears of the inhabitants till the evening of the fifteenth, when the earth was again violently agitated. Shortly after this, an opening was formed on the

Vesuvius.

western base of the mountain-cone, which, on after examination, was found to be two thousand three hundred and seventy-five feet in length, and two hundred and thirty-seven feet in breadth, and a stream of lava was ejected. Not long after the volcanic action had commenced, four distinct hills were formed, composed of lava, from each of which stones and other ignited substances were thrown in such quick succession, that it appeared as if they were each ejecting a vast flame of fire. At this time the lava flowed in great abundance, taking its course toward Portici and Resina. The inhabitants of Torre del Greco, rejoiced to see a prospect of their escape from the destroying fluid, were assembled together to return thanks for their deliverance, and to supplicate for their unfortunate neighbors, when they received the melancholy tidings that the lava had changed its direction, and was approaching their town. In flowing down a declivity, it had divided itself into three streams: one directing its course toward St. Maria del Pagliano, another toward Resina, and a third toward La Torre.

During the whole of this time the mountain was greatly convulsed, and deep hollow sounds were heard, which, together with the impetuous ejection of the lava, shook the mountain itself to the very base. When the oscillatory motion of the mountain ceased, the sounds became less frequent but more distinct; the lava flowed more abundantly, and the action seemed as though it were suffering under the last paroxysm of its dying energies. This was about four o'clock in the morning of the sixteenth, and at that time the intumescent mass had spread itself through all the streets of Torre del Greco, and from thence had flowed into the sea, covering its bed three hundred and sixty-two feet beyond the margin of the water, the current having a breadth of eleven hundred and twenty-seven feet. The distance from the point of ejection to the place where its progress was arrested was twelve thousand nine hundred and sixty-one feet.

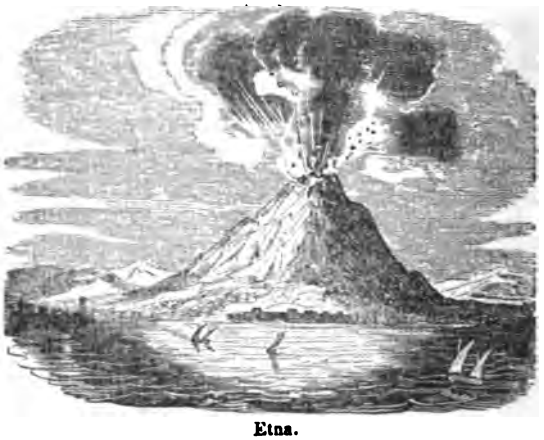
During the progress of the eruption, the summit of Vesuvius was perfectly quiescent, and no remarkable phenomenon was observed round the crater; but toward the dawn of day, the heights of the mountain were hidden by a dense

cloud of comminuted sand, which, spreading itself, in a short time covered the whole country, and the sun was darkened by an impenetrable mantle of clouds.

It is impossible to describe the horrors of that night, in which Vesuvius poured out its terrible fury on the beautiful valley beneath it. The fiery ejections and the inexpressible groans of the mountain, the death-like stillness of the atmosphere, and the cries of the thousands who had been driven from their homes and all the pleasures of life, must together have presented a combination of terrors which no imagination can realize

But it was not on the western side only that lava was ejected: there was an active crater on the eastern; and the stream which flowed from it filled the valley of Torienta, which was sixty-five feet wide, one hundred and twenty feet deep, and one thousand six hundred and twenty-seven feet long. From this valley it took its way into the plain of Forte, where, like the western stream, it divided into three branches, which severally took their course towards Bosco, Mauro, and the plains of Mulara. This current was not above half as large as that which flowed from the western side.

When the lava ceased to flow, the crater was covered by a dense cloud of comminuted pumice, which enveloped it the four following days, during which time the summit of the mountain fell into the internal cavity. The surrounding country, to the distance of ten or twelve miles, was wrapped in a midnight darkness, and thunder-storms were awfully frequent. The average depth of the sand which fell during this period, for a distance of three miles round Vesuvius, is said to have been fourteen and a half inches.



Etna.

We may take Etna as another example of volcanic activity in the phase of paroxysmal violence. This mountain is entirely composed of volcanic rocks, and rises in imposing grandeur to the height of ten thousand feet above the level of the sea. It is about one hundred and eighty miles in circumference, and is surrounded on every side by apparently small volcanic cones, though of no inconsiderable size. The earliest historical notice of this mountain is by Thucydides, who states that there were three eruptions previous to the Peloponnesian war, to one of which Pindar alludes, in his first Pythian Ode. In the year 396 B. C., the volcano was again active; and, according to Diodorus

Sicilia, the Carthaginian army was stopped by the flowing lava when marching upon Syracuse.

One of the most remarkable eruptions suffered by this mountain was that which occurred in the year 1669, which was so violent that fifteen towns and villages were destroyed, and the stream was so deep that the lava flowed over the walls of Catania, sixty feet in height, and destroyed a part of the city. But the most singular circumstance connected with this eruption was the formation of a number of extensive fissures, which appeared as though filled with immense rock. At the very commencement of the eruption, one was formed in the plain of St. Leo, twelve miles in length, and six feet broad, spouting a vivid flame, and shortly after five others were opened. The town of Nicolosi, situated twenty miles from the summit of Etna, was destroyed by earthquake, and near the place where it stood two gulfs were formed, from which so large a quantity of sand and scoriæ was thrown, that a cone called Mount Rosat, four hundred and fifty feet high, was produced in about three months.

We may, perhaps, introduce one other example of the effects produced by volcanoes in the exhibition of paroxysmal violence. Hecla has been long celebrated for the intensity and continuance of its eruptions. The island in which it is situated is not unfrequently shaken from its centre to its shores with violent earthquakes, and new islands are often formed upon its coasts, some of them sinking beneath the level of the water as quickly as they were formed, and others continuing for so many years as to give expectation of their permanence. Hecla has been more than twenty times in a state of eruption during the last eight hundred years, and, when excited, its devastating fury is not easily opposed. But Iceland is, as it were, the covering of one of the principal Vulcanian workshops, and its mountains are the chimneys of ever-active fires.

If we could mention one year as being more distinguished than any other

Hecla

for the violence of the volcanic force in Iceland, we might direct the attention of the reader to the year 1783. On the eleventh of June, Skaptár Jokul, a volcanic mountain that has often spread desolation over the surrounding country, ejected a considerable torrent of lava, which, flowing into the river Skapta, dried it up, and overflowed the fields beyond it, although in some places the bed was more than six hundred feet deep, and nearly two hundred feet wide. A deep lake between Skaptárdal and Aa was filled with the lava, and a subsequent current "was precipitated down a tremendous cataract called Stapafos, where it filled a profound abyss which that great waterfall had been hollowing out for ages, and after this the fiery current again continued its course."

The remarks of Professor Lyell upon the effects of this eruption are so explanatory and true, that we may be permitted to quote them. "These Icelandic lavas, like the ancient streams which are met with in Auvergne and other provinces of Central France, are stated by Stephenson to have accumulated to a prodigious depth in narrow rocky gorges, but when they came to wide alluvial plains they spread themselves out into broad burning lakes, sometimes from twelve to fifteen miles wide, and one hundred feet deep. When the 'fiery lake' which filled up the lower portion of the valley of the Skaptâ had been augmented by new supplies, the lava flowed up the course of the river to the foot of the hills, whence the Skaptâ takes its rise. This affords a parallel case to one which can be shown to have happened at a remote era in the volcanic region of the Vivarais, in France, where lava issued from the cone of Thueyts, and while one branch ran down, another more powerful stream flowed up the channel of the river Ardêche.

"The sides of the valley of the Skaptâ present superb ranges of basaltic columns of older lavas, resembling those which are laid open in the valleys descending from Mont d'Or, in Auvergne, where more modern lava-currents, on a scale very inferior in magnitude to those of Iceland, have also usurped the beds of the existing rivers. The eruption of Skaptár Jokul did not entirely cease till the end of two years; and when Mr. Paulson visited the tract eleven years afterward, in 1794, he found columns of smoke still rising from parts of the lava, and several rents filled with hot water."

DESTRUCTION OF HERCULANEUM AND POMPEII, BY THE ERUPTION OF VESUVIUS, A. D. 79.

Herculaneum was situated on a point of land, stretching into the Gulf of Naples, about two miles distant from that city, near the spot where the modern towns of Portici and Resina, and the royal palace by which they are separated, now stand. The neck of land on which it was built formed a small harbor. Hence the appellation of *Herculi Porticum*, (the small haven of Hercules,) sometimes given to Herculaneum; and hence, too, in all probability, the modern name of Portici.

Pompeii was situated about fourteen miles from Naples, on the road to Nocera; and it is said to owe its name to the triumphal pomp in which Hercules led his captives along the coast, after his conquest of Spain. It was probably situated on an arm of the sea, and served as a port for the inland towns; which inlet of the sea has been filled up by successive eruptions, besides that which destroyed the town; for the matter which covered both Herculaneum and Pompeii, when discovered, bore evident marks that six eruptions had

raised their course over that which lay immediately above them, and was the cause of their destruction.

This province, more than any other part of Magna Græcia, was always celebrated for the studious and successful cultivation of the arts and sciences. The towns of Herculaneum and Pompeii ranked next to Naples in every respect as places of considerable note; they had their public theatres, with every other attendant of great population, splendour, opulence, and general prosperity; and because in common with all the rest of Campania, the elegant and luxurious resort of the Romans, for the different purposes of health, retirement, luxury, and literary ease. In the ninth year of Nero's reign they experienced a very formidable shock from an earthquake, which is not the unfrequent forerunner of any violent volcanic eruption. Nor had they altogether recovered from the effects of this calamity, by their own exertions and the aid of imperial munificence, when a second catastrophe of a different nature, but equally unexpected, and still more awful in its effects, consigned them both to the most complete oblivion.

This catastrophe was the great eruption of Mount Vesuvius, which happened on the 24th of August, A. D. 79, the second year of the reign of that excellent emperor, Titus Vespasian. Herculaneum was almost instantaneously buried under a mass of lava and volcanic matter, to the depth of twenty-four feet. Pompeii, being at a greater distance from the mountain, was overwhelmed principally with a shower of ashes, and not in any place to more than half the depth in the other city. But the fate of both was sudden and inevitable; and yet it appears that almost all the inhabitants, and, what is an equally surprising circumstance, more of the Herculaneans than the Pompeiians, escaped.

Pliny was residing at Misenum, in the Gulf of Naples, where he commanded a squadron of the Roman fleet, being appointed by Titus to that station; when, on the 24th of August, in the year 79, about the seventh hour of the day, or one o'clock in the afternoon, his sister, Pliny the Younger's mother, desired him to observe a cloud of a very unusual size and shape. He had just returned from taking the benefit of the sun; and, having bathed himself in cold water and taken a slight repast, had retired to his study. He, however, rose immediately, and repaired to an eminence in the vicinity of the town, in hopes of gaining a more distinct view of this very uncommon appearance. It was not at that distance discernible from what mountain this cloud issued, but it was afterwards found to ascend from Mount Vesuvius. Pliny the Younger, who likewise observed the cloud, informs us that its shape resembled that of a pine tree, shooting up to a great height in the form of a trunk, and extending itself at the top into many branches. It sometimes appeared bright, and sometimes dark and spotted, according as it was more or less impregnated with earth and cinders.

That portentous cloud, the form of which had, on the preceding evening, borne some resemblance to one of those lofty pines, whose bare and branchless stems are surmounted by a vast canopy of verdure, became gradually more black and more extensive. Suddenly a luminous point appeared in the midst of the chaos; the vapors became red, and impregnated with fire; vivid flames illumined the air; and the substances discharged from the mouth of the volcano glowed with every tint, and exhibited every possible shade of color. Here the flame resembled that of the funeral torch, there that of the most lively vermilion; farther off it was white, and dazzled the eye with its excessive brightness; in another place it presented a murky mixture of purple and soot; over the centre of the mountain the vapors hovered in the form of a golden cloud; and those

which, from their distance, were incapable of reflecting the light, shrouded the whole scene in a sable veil, which, by the clashing contrast it produced, heightened all the colors, and imparted double brilliancy to the phenomenon.

But other wonders appeared at the crater of the volcano; sometimes showers of ignited stones shot upward to an immense height, and rained again in heavy torrents to the earth; at others, showers of ashes enveloped every object. Now a tuft of ardent vapors crowned the mountain, and emitted to a considerable distance innumerable sparks; and now again lightnings, bursting from the bosom of the abyss, cut through the surrounding smoke in their zigzag course. One moment the flame assumed the figure of a column, whose height was thrice that of the volcano, and the next it spread into one immense sheet over the adjacent country.

Anxiety was depicted on every countenance; fathers were heard calling for their children; children begging the assistance of their parents; and the very air resounded with the cries of anguish and distress.

"All wanted aid! But there was none to help."

Some wished to die from the very fear of dying; some lifted their hands to heaven and implored mercy; but the greater part imagined that the last and eternal night had come, and that the world was about to be dissolved, and reduced into that chaos from which it originally sprang.

Meantime, the sides of the mountain became incapable of containing the melted substances which rose and pressed against them. A dreadful noise, resembling that of the loudest thunder, with incessant reports like those from a numerous heavy artillery, accompanied by a continued hollow murmur, similar to that of the roaring of the ocean during a storm, announced an eruption at hand. In a moment rivers of red-hot liquid lava burst from the crater, and rushed down the sides of the mountain with impetuous velocity, increasing in breadth as they advanced, and forming torrents of burning fire. The strongest trees disappeared before them, like feeble blades of grass before the scythe of the mower; groves, gardens, villas, palaces, temples, towns, and cities, were overwhelmed by the fiery deluge; and within the course of twelve or twenty hours, at the utmost, the very spot upon which they recently stood had undergone so complete a change as to be no longer recognised.

At length, however, the dreadful darkness faded, and disappeared before the radiance of day; the sun darted his morning beams; the fire grew pale; the vapors became white; the roaring sounds were hushed; and there remained nothing but the singular appearance of a mountain moving by its own efforts.

ERUPTION OF THE TOMBORO MOUNTAIN IN JAVA.

The most extraordinary convulsions of Vesuvius and Etna, as they appear in the descriptions of the poet, or the more authentic accounts of the naturalist, bear no comparison in point of duration or force with this eruption in the Indian Archipelago, April 5, 1815. It extended perceptible evidence of its existence over the whole of the Molucca islands, over Java, a considerable portion of Celebes, Sumatra, and Borneo, to a distance of 1,000 statute miles from its centre, by tremulous motions and reports of explosions; while within the range of its more immediate activity, embracing a space of more than 300 miles around it, it produced the most astonishing effects, and excited the most

alarming apprehensions. On Java, at the distance of more than 300 miles, it seemed as he awfully present. The sky was overcast at noonday with clouds of ashes; the sun was enveloped in an atmosphere whose "palpable" density he was unable to penetrate; showers of ashes covered the houses, the streets, and the fields, to the depth of several inches, and amid the darkness, explosions were heard at intervals like the report of artillery, or the peals of distant thunder. So fully did the resemblance of the noises to the reports of cannon impress the minds of some officers, that, from an apprehension of pirates on the coast, vessels were despatched to afford relief. Superstition, on the other hand, was busily at work in the minds of the natives, and they attributed the reports to an artillery of a different description from that of pirates. The first explosions were heard on the 5th of April; a fall of ashes took place on the 6th; from that day the sun became obscured, and apparently enveloped in fog, till the 15th. On the 11th the explosions were tremendous, and shook the houses on the eastern part of Java. Candles were obliged to be lighted at six in the afternoon. The ground in some places was covered with ashes to the depth of eight inches. The darkness of the atmosphere, and occasional falls of volcanic ashes, continued till the 17th of April. From Sambawa, where the eruption took place, to the part of Sumatra where the sound was noticed, is a distance of 940 geographical miles, and clouds of ashes so dense as to create utter darkness at noonday, were experienced more than 300 geographical miles from the centre of its operations. The explosions did not cease entirely on the island of Sambawa till the 15th of July. Of all the villages of Tomboro, one only remained, containing about forty inhabitants. In Pekate no vestige of a house was left; and twenty-six of the inhabitants, who were at Sambawa at the time, were the only part of the population who escaped. There were not fewer than 12,000 individuals in Tomboro and Pekate at the time of the eruption, of whom only five or six escaped. The trees and herbage of every description along the whole of the north and west sides of the peninsula were completely destroyed, with the exception of one point of land near the spot where the village of Tomboro stood.

SUB-AQUEOUS VOLCANOES.

We have not authentic records of many sub-aqueous volcanoes. When it is considered that much the greater portion of the surface of the globe is covered by water, this fact may appear to intimate a much less active condition of the volcanic agent beneath the level of the sea than on dry land; but the elevation of the volcanic cones above the water is the real cause of this ascertained result. An eruption of any considerable violence must, of necessity, form an elevation that will come under the class of aerial volcanoes, and hence it is that so many active cones are situated in islands.

There is much difficulty in obtaining detailed information concerning the phenomena resulting from the activity of sub-aqueous volcanoes. That the eruptions are as numerous as from aerial craters, there can be no doubt; but there is less probability of their being observed. It is a singular fact, that we are acquainted with scarcely any instance of sub-aqueous eruption that has not produced an island, and yet it may be reasonably supposed that many do occur which have not sufficient energy to elevate the mineral masses above the level of the sea. This fact may be accounted for in two ways: the volcanic vent may be superposed by so great a depth of water, that no effect is produced on the surface by the eruption; or the energy which is exerted may be sufficient to occasion many phenomena on the surface of the water, though

no observer is present; and therefore in this instance, as well as in the former, we are prevented from gaining any information concerning the appearances exhibited.

ST. MICHAEL'S VOLCANO.

WITHOUT attending to a very obscure Portuguese tradition, according to which the whole island of Corvo arose from the sea by a volcanic eruption, we shall here mention that, during the great earthquake of 1757, which laid waste the island of St. George, and destroyed 1500 persons, or a seventh of its population, eighteen small islands, according to several authentic testimonies, although not circumstantially detailed, were seen to rise from the sea, at a distance of 200 hundred yards from the shore.

But the only sub-marine volcano, satisfactorily observed, is that near the island of St. Michael. It was during a violent earthquake in 1638 that flames and puffs of smoke were seen to rise from the agitated sea. According to the report of the fishermen, this vast fire was extended over a space of several acres; earthy matters and masses of rock were seen tossed into the air, and falling again into the sea, upon which they floated; other rocks of a blackish color seemed to rise from the waters; some of them were raised to a height of sixty fathoms: by degrees all these masses were united, covering a space of three leagues in length, and half a league in breadth. These eruptions continued during three weeks: all these rocks, raised above the sea, are then said to have disappeared without a trace being left. The fishermen, witnesses of this catastrophe, took fragments of the rocks ejected from the sea: they burst into fragments, and left nothing but a blackish gravel: these then were scoriæ and volcanic tuff. The crater of the volcano had afforded shelter to great numbers of fish: it was the ordinary rendezvous of the fishermen of the island; and at the time of the eruption, the sea ejected so many dead fish that the air became infected by them.

We must here notice a circumstance, of little importance in itself, but which, in its consequences, may become of the greatest interest for natural history and physical geography. The authorities we have already quoted, agree in fixing the period of this memorable eruption in the year 1638. Nevertheless, Buffon affirms that this occurrence took place in 1628; he relies on the authority of Mandelslo, a famous navigator: yet, in looking into the original German edition of Mandelslo's account, published by Olearius in 1658, nothing is to be found on the subject of this eruption: it is the same in the Dutch translation. The passage quoted and transcribed by Buffon is only to be found in the French translation by Wiquefort, (Paris, 1678,) and in the English one, in Harris's collection, (London, 1705;) it was natural to reject an opinion so feebly supported; but if, nevertheless, by a chance not without example, this opinion should be found confirmed by some new testimony; if Gassendi and Kircher were deceived in substituting 1638 for 1628, the three known eruptions of this volcano, namely, that of which we have been treating, and those of 1720 and 1811, would be found at a distance from each other of from ninety-one to ninety-two years; which will allow of our considering this volcano as being subject to a *regular period*. So curious a result merits a farther examination of the true date of the eruption of the seventeenth century.

Whatever may be the real nature of this chronological question, the date of the eruptions of 1720 is well established. It was in the month of November of that year, that, after a violent earthquake, an island resembling a conical mountain was observed to rise between the islands of St. Michael and Terceira; it

emitted flames, ashes, and pumice stones; a torrent of burning lava ran down on sleep sides; it became as large as a marine league in circumference, and was visible at a distance of eight or ten leagues. It soon, however, began to sink, and in the month of November, 1723, had disappeared altogether. The soundings gave eighty fathoms in the very spot where it had appeared. Many detailed, circumstances, and authentic accounts, are given respecting the emersion of this island; the appearance on the spot has even been drawn; so that it is difficult to raise any doubt of the reality of the occurrence. This, however, has been attempted by a learned Spanish hydrographer; he maintains that this pretended island was nothing but a collection of scoria and pumice stones, thrown out that same year from the Peak of the Azores, the Peak of Camarinhas, (in the island of Saint Michael,) and other volcanoes of this archipelago, carried along and united by the marine currents. But the height of the island, and the appearance drawn, sufficiently refute these ideas. It will only remain to examine whether this island existed in the same situation with that of 1628 or 1629: there are accounts that place it much farther in the sea.

The same uncertainty prevails respecting the volcanic island that rose in these seas in the month of July, 1811. The reports of navigators, who were eye-witnesses, forcibly describe the terrors produced in them by this physical revolution;—the sea boiling, a column of fire, smoke, and ashes thrown up into the air; the destruction of a part of the island of St. Michael; dead fish; and the waves covered with pumice stones. But the volcanic island appeared to the south-east of the great island, which does not appear to agree with the position of the volcanic island of 1720. An English captain, who was present at the rise of this island, assigns to it three miles of circumference,—he gave it the name of *Sabrina*, and took possession of it as an *English discovery*; the sea, however, has already swallowed up this new British possession.—*Malte-Brun.*

The most recent instance of sub-aqueous eruption with which we are acquainted, is that which produced Hotham or Graham island, in the year 1831. This island was thrown up in the Mediterranean, between the southwest coast of Sicily and the African coast, in latitude 37° 8′ 30″ north, and longitude 12° 42′ 15″ east. The eruption seems to have been first observed by John Corrao, the captain of a Sicilian vessel, who, passing near to the spot on the 10th of July, observed an immense column of water ejected from the sea to the height of sixty feet, and about eight hundred yards in circumference.

On the 18th of July, Corrao again passed the same spot, and he found that a small island had been formed, twelve feet high, with a crater in the centre, from which immense columns of vapor were ejected, and masses of volcanic matter.

The island was afterwards visited by several scientific gentlemen, and it is said to have been two hundred feet high, and three miles in circumference, on the 4th of August. But from this time the island decreased in size; for being composed of loose scoriæ and pumice, it was rapidly acted upon by the water, and on the 3d of September, when carefully measured by Captain Wodehouse, was only three fifths of a mile in circumference, and one hundred and seven feet high. At the end of October the island had entirely disappeared, except one small point composed of sand and scoriæ. Captain Swinburne examined the spot in the beginning of the year 1832, and found an extensive shoal to occupy the place where the island had been, and in 1833, there was a dangerous reef, of an oval form, three fifths of a mile in circumference.

We may now close our remarks upon the active volcanoes, by the mention of one of two facts deduced from the consideration of the geographical arrangement, relative position, and attendant phenomena of active cones.

Graham Island, as seen by Corrao on the 18th of July.

1. Nearly all the active volcanic cones are either situated in the immediate neighborhood of the sea, or near some salt-water lake. A great number are found in islands, and many of the islands themselves have been produced by the volcanic cause. Some few exceptions, however, must be made to this rule, and we may particularly mention the American volcanoes, some of which are situated in the interior of the continent, but from their relative position there is some reason to suppose that they are ranged over the same general line of com-

munication with the sea. The volcano of Jorullo is more distant from the sea than any other; yet on one side it is connected with the Atlantic by Tuxtla, and on the other with the Pacific by Colima.

2. Another observation, deduced from the geographical position of volcanoes, is, that they are generally arranged in lines. It is true that we may here and there find a solitary cone apparently unconnected with any other mountain, as is the case with Etna, and the Peak of Teneriffe; and, at other times, we may observe a small group of volcanoes, as in South America; but their most common position is in lines. The volcanoes of South America are arranged in this manner; and the fact suggested to Humboldt the supposition that they might be ranged over an immense chasm of intumescent matter.

3. Volcanoes are not confined to situations of any particular geological formation. They are found among primitive and secondary rocks; and the only restraint upon the formation of a volcanic cone, is the existence of an opposing force in the constitution of the mineral crust greater than the projecting force of the volcanic agent.

4. Earthquakes and thermal springs have their origin in the same agency as volcanoes. This statement leads us at once to a consideration of the circumstances under which these two classes of phenomena are exhibited.

CRATER OF KIRAUEA.

The volcano of Kirauea is situated in Hawaii (Owhyhee), the largest of the Sandwich Islands, about twenty-five miles from the seashore. It was visited some time since by the missionaries in those islands, and described in the journal of their tour. The following description is collected from it:—

"We travelled on, clearing every ohelo bush that grew near the path, till about two o'clock, P. M. (August 1), when the Crater of Kirauea all at once burst upon our view. We expected to see a mountain with a broad base, and rough, indented sides, composed of loose slags, or streams of lava, and whose summit would present a rugged wall of scoriæ, forming the rim of a mighty caldron. But instead of this, we found ourselves on the edge of a steep precipice, with a vast plain before us, fifteen or sixteen miles in circumference, and sunk from 200 to 400 feet below its original level. The surface of the plain below was uneven, and strewed over with large stones and volcanic rocks, and in the centre of it was the great crater, a mile or a mile and a half distant from the precipice on which we were standing."

"Led by our guides, we walked on to the north end of the ridge, where, the precipice being less steep, a descent to the plain below seemed practicable. It required, however, the greatest caution, as the stones and fragments of rocks frequently gave way under our feet, and rolled down from above; and with all our care we did not reach the bottom without several falls and slight bruises. After walking some distance over the sunken plain, which in several places sounded hollow under our feet, we came suddenly to the edge of the great crater, where a spectacle sublime and appalling presented itself before us.

"Astonishment and awe for some moments deprived us of speech, and like statues we stood fixed to the spot, with our eyes riveted on the abyss below.

"Immediately before us yawned an immense gulf, in the form of a crescent, upward of two miles in length, about a mile across, and apparently eight hundred feet deep. The bottom was filled with lava, and the south-west and northern parts of it were one vast flood of liquid fire, in a state of terrific ebulli-

tion, rolling to and fro its 'fiery surge' and flaming billows. Fifty-one craters, of varied form and size, rose like so many conical islands from the surface of the burning lake. Twenty-two constantly emitted columns of gray smoke, or pyramids of brilliant flame."

"The sides of the gulf before us were perpendicular for about four hundred feet; when there was a wide horizontal ledge of solid black lava, of irregular breadth, but extending completely round. Beneath this black ledge the sides sloped toward the centre, which was, as nearly as we could judge, three hundred or four hundred feet lower. It was evident that the crater had been recently filled with liquid lava up to this black ledge, and had, by some subterranean canal, emptied itself into the sea, or inundated the low land on the shore.

"Removing then along the western side of the crater till we reached the north end, we deposited the few provisions and little baggage that we had, and having quenched our thirst with water brought in canteens, we directed the natives to build a hut for us to pass the night in, in such a situation as to command a view of the burning lava; and while they were thus employed, we prepared to examine the many interesting objects around us.

"Between nine and ten, the dark clouds and heavy fog, that since the setting of the sun had hung over the volcano, gradually cleared away, and the fires of Kirauea, darting their fierce light athwart the midnight gloom, unfolded a sight terrible and sublime beyond all we had yet seen.

"The agitated mass of lava, like a flood of melted metal, raged with tumultuous whirl. The lively flame that danced over its surface, tinged with sulphureous blue, or glowing with red, cast a broad glare of light on the indented sides of the insulated craters, whose bellowing mouths, amid flames and eddying streams of fire, shot up at intervals, with loudest detonations, spherical masses of fusing lava, or ignited stones.

"The dark bold outline of the perpendicular and jutting rocks around formed a striking contrast with the luminous lake below, whose rays, thrown on the rugged promontories, and reflected by the overhanging clouds. combined to complete the awful grandeur of the scene."

The following is from a description of the same volcano by the Rev. Charles S. Stewart, who afterward visited it in company with Lord Byron, a British officer:—

"The gulf below contains between fifty and sixty smaller conical craters, many of which are in constant action. The tops and sides of two or three of these are covered with sulphur of mingled shades of green and yellow; with the exception of these, the ledge and everything below it is of a dismal black.

"As the darkness of the night gathered round us, new and powerful effect was given to the scene. Fire after fire, which the glare of midday had entirely concealed, began to glimmer on the eye with the first shades of evening; and as the darkness increased, appeared in such rapid succession, as forcibly to remind me of the hasty lighting of the lamps of a city on the sudden approach of a gloomy night. Two or three of the small craters nearest the north side where we lodged were in full action, every moment casting out stones ashes, and lava, with heavy detonations."

"A whole lake of fire also opened in a more distant part. This could not have been less than two miles in circumference, and its action was more horribly sublime than anything I ever imagined to exist even in the idler visions of unearthly things. Its surface had all the agitation of an ocean—billow after billow tossed its monstrous bosom in the air, and occasionally those from opposite directions met with such violence as to dash the fiery spray in the concussion, forty or fifty feet high."

EARTHQUAKES.

"Towers, temples, palaces,
Shaken from their deep foundations, rent on rent
Crashed horrible, and pile on pile o'erturned,
Fell crash."
MALLET.

"The pale-faced earth's hollow surface shakes,
And in the ruling of her slumbering sons,
O'er desolation an dead revels keep;
Where stood towns support the conqueror's heel."
YOUNG.

THESE fires to a very great extent, and produced by various causes, exist at different depths beneath the surface of the earth, must be evident to those who have attentively perused what has been given under the head of volcanoes; and recent experiments have shown, that where the substances in which such fires occur lie at a considerable depth, and are surmounted by a very deep and heavy superincumbent pressure, more especially when they contain large portions of elastic gases, the effect of such fires will be much greater and more diversified than where these circumstances are absent.

Among the most powerful and extraordinary of these effects, earthquakes are to be reckoned. They are unquestionably the most dreadful of the phenomena of nature, and are not confined to those countries which, from the influence of climate, their vicinity to volcanic mountains, or any other similar cause, have been considered as more particularly subject to them, their effects having at times been felt in the British Isles, although not in so extensive and calamitous a degree. Their shocks and the eruptions of volcanoes have been considered as manifestations of the effects of one common cause; and where the agitation produced by an earthquake extends further than there is reason to expect a subterraneous conflagration, it is probably propagated through the earth nearly in the same manner as a noise is conveyed through the air. The different hypotheses which have been imagined on this subject may be reduced to the following:—

Some naturalists have ascribed earthquakes to water, others to fire, and others again to air; each of these powerful agents being supposed to operate in the bowels of the earth, which they assert to abound everywhere with huge subterraneous caverns, veins, and canals, some filled with water, others with gaseous exhalations, and others replete with various substances, such as nitre, sulphur, bitumen, and vitriol. Each of these opinions has its advocates, who have written copiously on the subject.

In a paper published in the Philosophical Transactions, Dr. Lister ascribes earthquakes, as well as thunder and lightning, to the inflammable breath of the proxes, a subterraneous sulphur capable of spontaneous combustion; in a word, as Pliny had observed before him, he supposes an earthquake to be nothing more than subterraneous thunder. Dr. Woodward thinks that the subterraneous fire which continually raises the water from the abyss or great reservoir in the centre of the earth, for the supply of dew, rain, springs, and rivers, being diverted from its ordinary course by some accidental obstruction in the pores through which it used to ascend to the surface, becomes, by such means, preternaturally assembled in a greater quantity than usual in one place, and thus causes a rarefaction and intumescence of the water of the abyss, throwing it into violent commotions, and at the same time making the like effort on the

earth, which being expanded on the surface of the abyss, occasions an earthquake. Mr. Mitchell supposes these phenomena to be occasioned by subterraneous fires, which, if a large quantity of water be let loose on them suddenly, may produce a vapor, the quantity and elastic force of which may fully suffice for the purpose. Again, M. Amontus, a member of the French Academy of Sciences, endeavors to prove, that on the principle of experiments made on the weight and spring of the air, a moderate degree of heat may bring that element into a state capable of causing earthquakes.

Modern electrical discoveries have thrown much light on this subject. Dr. Stukely strenuously denies that earthquakes are to be ascribed to subterraneous winds, fires, or vapors, and thinks that there is not any evidence of the cavernous structure of the earth, which such an hypothesis requires. Subterraneous vapors, he thinks, are altogether inadequate to the effects produced by earthquakes, more particularly in cases where the shock is of considerable extent: for a subterraneous power capable of moving a surface of earth only thirty miles in diameter, must be lodged at least fifteen or twenty miles below the surface, and move an inverted cone of solid earth whose basis is thirty miles in diameter, and axis fifteen or twenty miles, which he thinks absolutely impossible. How much more inconceivable is it, then, that any such power could have produced the earthquake of 1755, which was felt in various parts of Europe and Africa, and in the Atlantic ocean; or that which in Asia Minor, in the seventeenth year of the Christian era, destroyed thirteen great cities in one night, and shook a mass of earth three hundred miles in diameter! To effect this, the moving power, supposing it to have been of internal fire or vapor, must have been lodged two hundred miles beneath the surface of the earth. Besides, in earthquakes the effect is instantaneous; whereas the operation of elastic vapor and its discharge must be gradual, and require a long space of time; and if these be owing to explosions, they must alter the surface of the country where they happen, destroy the fountains and springs, and change the course of its rivers:—results which are contradicted by history and observation.

To these and other considerations, the Doctor adds that the strokes which ships receive during an earthquake must be occasioned by something which can communicate motion with much greater velocity than any heaving of the earth under the sea caused by the elasticity of generated vapors, which would merely produce a gradual swell, and not such an impulsion of the water as resembles a violent blow on the bottom of a ship, or its striking on a rock. Hence he deems the common hypothesis insufficient, and adduces several reasons to show that earthquakes are in reality electric shocks. To confirm this opinion, he notices, among other phenomena, that the weather is annually dry and warm for some time before they happen.

He says that the surface of the ground is prepared by this dry and warm weather for that kind of electrical vibration in which earthquakes consist; while, at the same time, in several places where they have occurred, the internal parts, at a small depth beneath the surface, were moist and boggy. Hence he infers, that they reach very little beneath the surface. That the southern regions are more subject to earthquakes than the northern, he thinks is owing to the greater warmth and dryness of the earth and air, which are qualities so necessary to electricity. It may here be noticed, that, before the earthquakes of London, in 1749, all vegetation was remarkably forward; and it is well known that electricity quickens vegetation. The frequent and singular appearance of boreal and austral *auroræ*, and the variety of meteors by which earthquakes are preceded, indicate an electrical state of the atmosphere; and the Doctor appre-

hends that, in this state of the earth and air, nothing more is necessary to produce these phenomena, than the approach of a non-electric cloud and the discharge of its contents on any part of the earth, when in a highly electrified state. In the same way as the discharge from an excited tube occasions a commotion in the human body, so the shock produced by the discharge between the cloud and many miles in compass of solid earth, must be an earthquake, and the snap from the contact, the noise attending it.

The theory of M. de St. Lazare differs from the above hypothesis, as to the electrical cause. It ascribes the production of earthquakes to the interruption of the equilibrium between the electrical matter diffused in the atmosphere, and that which belongs to the mass of our globe and pervades its bowels. If the electrical fluid should be superabundant, as may happen from a variety of causes, its current, by the laws of motion peculiar to fluids, is carried towards those places where it is in a similar quantity: and thus it will sometimes pass from the internal parts of the globe into the atmosphere. This happening, if the equilibrium be re-established without difficulty, the current merely produces the effect of what M. de St. Lazare calls ascending thunder; but if this re-establishment be opposed by considerable and multiplied obstacles, the consequence is then an earthquake, the violence and extent of which are in exact proportion to the degree of interruption of the equilibrium, the depth of the electric matter, and the obstacles which are to be surmounted. If the electric furnace be sufficiently large and deep to give rise to the formation of a conduit or issue, the production of a volcano will follow, its successive eruptions being, according to him, nothing more in reality than electric repulsions of the substances contained in the bowels of the earth. From this reasoning he endeavors to deduce the practicability of forming a counter-earthquake, and a counter-volcano, by means of certain electrical conductors, which he describes, so as to prevent these convulsions in the bowels of the earth.

The opinion of Signior Beccario is nearly similar; and from his hypothesis and that of Dr. Stukely, the celebrated Priestly has endeavored to form one still more general and more feasible. He supposes the electric fluid to be in some mode or other accumulated on one part of the surface of the earth, and on account of the dryness of the season, not to diffuse itself readily: it may thus, as Beccaria conjectures, force its way into the higher regions of the air, forming clouds out of the vapors which float in the atmosphere, and may occasion a sudden shower, which may further promote its progress. The whole surface being thus unloaded, will, like any other conducting substance, receive a concussion, either on parting with, or on receiving any quantity of the electric fluid. The rushing noise will likewise sweep over the whole extent of the country; and, on this supposition also, the fluid, in its discharge from the surface of the earth, will naturally follow the course of the rivers, and will take the advantage of any eminences to facilitate its ascent into its higher regions of the air.

Such are the arguments in favor of the electrical hypothesis; but since it has been supported with so much ability, an ingenious writer, Whitehurst, in his Inquiry into the Original State and Formation of the Earth, contends that subterraneous fire, and the steam generated from it, are the true and real causes of earthquakes. When, he observes, it is considered that the expansive force of steam is to that of gunpowder as twenty-eight to one, it may be conceded that this expansive force, and the elasticity of steam, are in every way capable of producing the stupendous effects attributed to these phenomena.

Among the most striking phenomena of earthquakes, which present a fearful assemblage of the combined effects of air, earth, fire, and water in a state of

unrestrained contention, may be noticed the following:—Before the percussion, a rumbling sound is heard, proceeding either from the air, or from fire, or, perhaps, from both in conjunction, forcing their way through the chasms of the earth, and endeavoring to liberate themselves: this, as has been seen, likewise happens in volcanic eruptions. Secondly, a violent agitation or heaving of the sea sometimes following the shock: this is also a volcanic effect. Thirdly, a spouting up of the waters to a great height—a phenomenon which is common to earthquakes and volcanoes, and which cannot be readily accounted for. Fourthly, a rocking of the earth, and occasionally what may be termed a perpendicular rebounding: this diversity has been supposed by some naturalists to arise chiefly from the situation of the place, relatively to the subterraneous fire, which, when immediately beneath, causes the earth to rise, and when at a distance, to rock. Fifthly, earthquakes are sometimes observed to travel onward, so as to be felt in different countries at different hours of the same day. This may be accounted for by the violent shock given to the earth at one place, and communicated progressively by an undulatory motion, successively affecting different regions as it passes along, in the same way as a blow given by a stone thrown into a lake is not perceived at the shore until some time after the first concussion. Sixthly, the shock is sometimes instantaneous, like the explosion of gunpowder, and sometimes tremendous, lasting for several minutes. The nearer to the observer the place where the shock is first given, the more instantaneous and simple it appears; while, at a greater distance, the earth seems to redouble the first blow, with a sort of vibratory continuation. Lastly, as the waters have in general so great a share in the production of earthquakes, it is not surprising that they should generally follow the breaches made by the force of fire, and appear in the great chasms opened by the earth. The most remarkable earthquakes of ancient times are described by Pliny in his Natural History. Among the most extensive and destructive of these, was the one already noticed, by which thirteen cities in Asia Minor were swallowed up in one night. Another which succeeded shook the greater part of Italy. But the most extraordinary one described by him happened during the consulate of Lucius Marcus and Sextus Julius, in the Roman province of Mutina. He relates, that two mountains felt so tremendous a shock, that they seemed to approach and retire with a most dreadful noise. They at the same time, and in the middle of the day, cast forth fire and smoke, to the dismay of the astonished spectator. By this shock several towns were destroyed, and all the animals in their vicinity killed. During the reign of Trajan, the city of Antioch was, together with a great part of the adjacent country, destroyed by an earthquake; and about three hundred years after, during the reign of Justinian, it was again destroyed with the loss of forty thousand of its inhabitants. Lastly, after an interval of sixty years, that ill-fated city was a third time overwhelmed, with a loss of sixty thousand souls.

The earthquake which happened at Rhodes, upwards of two hundred years before the Christian era, threw down the famous Colossus, together with the arsenal, and a great part of the walls of the city. In the year 1182, the greater part of the cities of Syria, and of the kingdom of Jerusalem, were destroyed by a similar catastrophe; and in 1594, the Italian writers describe an earthquake at Puteoli, which occasioned the sea to retire two hundred yards from its former bed.

The dreadful earthquake which happened in Calabria in 1638, is described by the Father Kircher, who was at that time on his way to Sicily to visit Mount Etna. In approaching the Gulf of Charybdis, it appeared to whirl round in such a manner as to form a vast hollow, verging to a point in the centre. On looking toward Etna, it was seen to emit large volumes of smoke of a moun-

tainous size, which entirely covered the whole island, and obscured from view the very shores. This, together with the dreadful noise, and the sulphureous stench, which was strongly perceptible, filled him with apprehensions that a still more dreadful calamity was impending. The sea was agitated, covered with bubbles, and had altogether a very unusual appearance. The Father's surprise was still increased by the serenity of the weather, there not being a breath of air nor a cloud which might be supposed to put all nature thus in motion. He therefore warned his companions that an earthquake was approaching, and landed with all possible diligence at Tropæa, in Calabria.

He had scarcely reached the Jesuits' College, when his ears were stunned with a horrid sound, resembling that of an infinite number of chariots driven fiercely forward, the wheels rattling, and the thongs cracking. The tract on which he stood seemed to vibrate, as if he had been in the scale of a balance which still continued to waver. The motion soon becoming more violent, he was thrown prostrate on the ground. The universal ruin around him now redoubled his amazement; the crash of falling houses, the tottering of towers, and the groans of the dying, all contributed to excite emotions of terror and despair. Danger threatened him wherever he should flee; but having remained unhurt amid the general concussion, he resolved to venture for safety, and reached the shore, almost terrified out of his reason. Here he found his companions, whose terrors were still greater than his own.

He landed on the following day at Rochetta, where the earth still continued to be violently agitated. He had, however, scarcely reached the inn at which he intended to lodge, when he was once more obliged to return to the boat: in about half an hour, the greater part of the town, including the inn, was overwhelmed, and the inhabitants buried beneath its ruins.

Not finding any safety on land, and exposed by the smallness of the boat to a very hazardous passage by sea, he at length landed at Lopizium, a castle midway between Tropæa and Euphæmia, the city to which he was bound. Here, wherever he turned his eyes, nothing but scenes of ruin and horror appeared: towns and castles were levelled to the ground; while Stromboli, although sixty miles distant, was seen to vomit flames in an unusual manner, and with a noise which he could distinctly hear. From remote objects his attention was soon diverted to contiguous danger: the rumbling sound of an approaching earthquake, with which he was by this time well acquainted, alarmed him for the consequences. Every instant it grew louder, as if approaching; and the spot on which he stood shook so dreadfully, that being unable to stand, himself and his companions caught hold of the shrubs which grew nearest to them, and in that manner supported themselves.

This violent paroxysm having ceased, he now thought of prosecuting his voyage to Euphæmia, which lay within a short distance. Turning his eyes toward that city, he could merely perceive a terrific dark cloud, which seemed to rest on the place. He was the more surprised at this, as the weather was remarkably serene. Waiting, therefore, until this cloud had passed away, he turned to look for the city; but, alas! it was totally sunk, and in its place a dismal and putrid lake was to be seen. All was a melancholy solitude—a scene of hideous desolation. Such was the fate of the city of Euphæmia; and such the devastating effects of this earthquake, that along the whole coast of that part of Italy, for the space of two hundred miles, the remains of ruined towns and villages were everywhere to be seen, and the inhabitants, without dwellings, dispersed over the fields. Father Kircher at length terminated his distressful voyage by reaching Naples, after having escaped a variety of perils both by sea and land.

The great earthquake of 1755 extended over a tract of at least four millions of square miles. Its effects were even extended to the waters, in many places where the shocks were not perceptible. It pervaded the greater portions of the continents of Europe, Africa, and America; but its extreme violence was exercised on the south-western part of the former.

Lisbon, the Portuguese capital, had already suffered greatly from an earth quake in 1531, and since the calamity about to be described, has had three such visitations: in 1761, 1765, and 1772, which were not, however, attended by equally disastrous consequences. In the present instance, it had been remarked that since the commencement of the year 1750, less rain had fallen than had been known in the memory of the inhabitants, unless during the spring preceding the calamitous event. The summer had been unusually cool, and the weather fine and clear for the last forty days. At length, on the first of November, about forty minutes past nine in the morning, a most violent shock of an earthquake was felt: its duration did not exceed six seconds; but so powerful was the concussion, that it overthrew every church and convent in the city, together with the Royal Palace, and the magnificent Opera House adjoining it; in short, not any building of consequence escaped. About one fourth of the dwelling-houses were thrown down; and, at a moderate computation, thirty thousand individuals perished. The sight of the dead bodies, and the shrieks of those who were half buried in the ruins, were terrible beyond description; and so great was the consternation, that the most resolute person durst not stay a moment to extricate the friend he loved most affectionately, by the removal of the stones beneath the weight of which he was crushed. Self-preservation alone was consulted; and the most probable security was sought, by getting into open places, and into the middle of the streets. Those who were in the upper stories of the houses, were in general more fortunate than those who attempted to escape by the doors, many of the latter being buried beneath the ruins, with the greater part of the foot passengers. Those who were in the carriages escaped the best, although the drivers and cattle suffered severely. The number, however, of those who perished in the streets and in the houses was greatly inferior to that of those who were buried beneath the ruins of the churches; for, as it was a day of solemn festival, these were crowded for the celebration of the mass. They were more numerous than the churches of London and Westminster taken collectively; and the lofty steeples in most instances fell with the roof, insomuch that few escaped.

The first shock, as has been noticed, was extremely short, but was quickly succeeded by two others; and the whole, generally described as a single shock, lasted from five to seven minutes. About two hours after, fires broke out in three different parts of the city; and this new calamity prevented the digging out of the immense riches concealed beneath the ruins. From a perfect calm, a fresh gale immediately after sprang up, and occasioned the fire to rage with such fury, that in the space of three days the city was nearly reduced to ashes. Every element seemed to conspire toward its destruction; for, soon after the shock, which happened near high water, the tide rose in an instant forty feet, and at the castle of Belem, which defends the entrance of the harbor, fifty feet higher than had ever been known. Had it not subsided as suddenly, the whole city would have been submerged. A large new quay sunk to an unfathomable depth, with several hundreds of persons, not one of the bodies of whom was afterward found. Before the sea thus came rolling in like a mountain, the bar was seen dry from the shore.

The terrors of the surviving inhabitants were great and multiplied. Amid the general confusion, and through a scarcity of hands, the dead bodies could

RUINS OF THE CATHEDRAL OF MESSINA
AFTER THE EARTHQUAKE OF 1908

not be buried, and it was dreaded that a pestilence would ensue; but from this apprehension they were relieved by the fire, by which these bodies were for the greater part consumed. The fears of a famine were more substantial; since, during the three days succeeding the earthquake, an ounce of bread was literally worth a pound of gold. Several of the corn magazines having been, however, fortunately saved from the fire, a scanty supply of bread was afterward procured. Next came the dread of the pillage and murder of those who had saved any of their effects; and this happened in several instances, until examples were made of the delinquents.

The great shock was succeeded about noon by another, when the walls of several houses which were still standing were seen to open from the top to the bottom more than a fourth of a yard, and afterwards to close again so exactly as not to leave any signs of injury. Between the first and the eighth of November, twenty-two shocks were reckoned.

A boat on the river, about a mile distant from Lisbon, was heard by the passengers to make a noise as if it had run aground, although then in deep water: they at the same time saw the houses falling on both sides of the river, in front of which, on the Lisbon side, the greater part of a convent fell, burying many of its inmates beneath the ruins, while others were precipitated into the river. The water was covered with dust blown by a strong northerly wind, and the sun was entirely obscured. On landing, they were driven by the overflowing of the waters to the high grounds, whence they perceived the sea, at a mile's distance, rushing in like a torrent, although against wind and tide. The bed of the Tagus was in many places raised to its surface; while ships were driven from their anchors, and jostled together with such violence that their crews did not know whether they were afloat or aground. The master of a ship, who had great difficulty in reaching the port of Lisbon, reported that, being fifty leagues at sea, the shock was there so violent as to damage the deck of the vessel. He fancied he had mistaken his reckoning, and struck on a rock.

The following observations, relative to this fatal earthquake, were made at Colares, about twenty miles from Lisbon, and within two miles of the sea. On the last day of October, the weather was clear and remarkably warm for the season. About four o'clock in the afternoon a fog arose, proceeding from the sea, and covering the valleys, which was very unusual at that season of the year. The wind shifted soon after to the east, and the fog returned to the sea, collecting itself, and becoming exceedingly thick. As the fog retired, the sea rose with a prodigious roaring. On the first of November, the day broke with a serene sky, the wind continuing at east; but about nine o'clock the sun began to be obscured; and about half an hour after, a rumbling noise was heard, resembling that of chariots, and increasing to such a degree that at length it became equal to the explosions of the largest artillery. Immediately a shock of an earthquake was felt; and this was succeeded by a second and a third, at the same time that several light flames of fire, resembling the kindling of charcoal, issued from the mountains. During these three shocks, the walls of the buildings moved from east to west. In another spot where the sea-coast could be descried, a great quantity of smoke, very thick, but somewhat pale, issued from the hill named the Fojo. This increased with the fourth shock at noon, and afterwards continued to issue in a greater or less degree. Immediately as the subterraneous rumblings were heard, the smoke was observed to burst forth at the Fojo; and its volume was constantly proportioned to the noise. On visiting the spot whence it was seen to arise, not any sign of fire could be perceived near it.

After the earthquake, several fountains were dried up; while others, after

undergoing great changes, returned to their pristine state. In places where there had not been any water, springs burst forth and continued to flow; several of these spouted to the height of nearly twenty feet, and threw up sand of various colors. On the hills rocks were split, and the earth rent; while towards the coast, several large portions of rock were thrown from the eminences into the sea.

Now that we are on the ravages of the earthquake at Lisbon, we will introduce several extracts from another account of the same event, for the purpose of giving several additional cuts by way of illustration of that tremendous scene. These extracts are from "Davy's Letters on Literature," purported to have been communicated to him by an English merchant resident at the time in that ill-fated city.

"There never was a finer morning seen than the first of November; the sun shone out in its full lustre; the whole face of the sky was perfectly serene and clear; and not the least signal or warning of that approaching event, which has made this once flourishing, opulent, and populous city a scene of the utmost horror and desolation, except only such as served to alarm, but scarcely left a moment's time to fly from the general destruction.

"It was on the morning of this fatal day, between the hours of nine and ten, that I had sat down in my apartment, just finishing a letter, when the papers and table I was writing on began to tremble with a gentle motion, which rather surprised me, as I could not perceive a breath of wind stirring. While I was reflecting with myself what this could be owing to, but without having the least apprehension of the real cause, the whole house began to shake from the very foundation; which at first I imputed to the rattling of several coaches in the main street, which usually passed that way at this time from Belem to the palace; but on hearkening more attentively, I was soon undeceived, as I found it was owing to a strange frightful kind of noise under ground, resembling the hollow distant rumblings of thunder. All this passed in less than a minute, and I must confess I now began to be alarmed, as it naturally occurred to me that this noise might possibly be the forerunner of an earthquake, as one I remembered, which had happened about six or seven years ago, in the island of Madeira, commenced in the same manner, though it did little or no damage.

"Upon this I threw down my pen, and started upon my feet, remaining a moment in suspense, whether I should stay in the apartment or run into the street, as the danger in both places seemed equal; and still flattering myself that this tremor might produce no other effects than such inconsiderable ones as had been felt at Madeira; but in a moment I was roused from my dream, being instantly stunned with a most horrid crash, as if every edifice in the city had tumbled down at once. The house I was in shook with such violence that the upper stories immediately fell, and though my apartment (which was the first floor) did not then share the same fate, yet every thing was thrown out of its place in such a manner, that it was with no small difficulty I kept my feet, and expected nothing less than to be soon crushed to death, as the walls continued rocking to and fro in the frightfulest manner, opening in several places; large stones falling down on every side from the cracks, and the ends of most of the rafters starting out from the roof. To add to this terrifying scene, the sky in a moment became so gloomy that I could now distinguish no particular object; it was an Egyptian darkness indeed, such as might be felt: owing, no doubt, to the prodigious clouds of dust and lime raised from so violent a concussion, and, as some reported, to sulphureous exhalations, but this I cannot affirm; however, it is certain I found myself almost choked for near ten minutes."

Our author then proceeds to describe his escape from his place of residence through a long narrow street, exposed to the most imminent perils from the falling fragments of shattered buildings. He continues thus :—

"I proceeded on as fast as I conveniently could, though with the utmost caution, and having at length got clear of this horrid passage, I found myself safe and unhurt in the large open space before St. Paul's church, which had been thrown down a few minutes before, and buried a great part of the congregation, that was generally pretty numerous, this being reckoned one of the most populous parishes in Lisbon. Here I stood some time considering what I should do, and not thinking myself safe in this situation, I came to the resolution of climbing over the ruins of the west end of the church, in order to get to the river's side, that I might be removed as far as possible from the tottering houses, in case of a second shock.

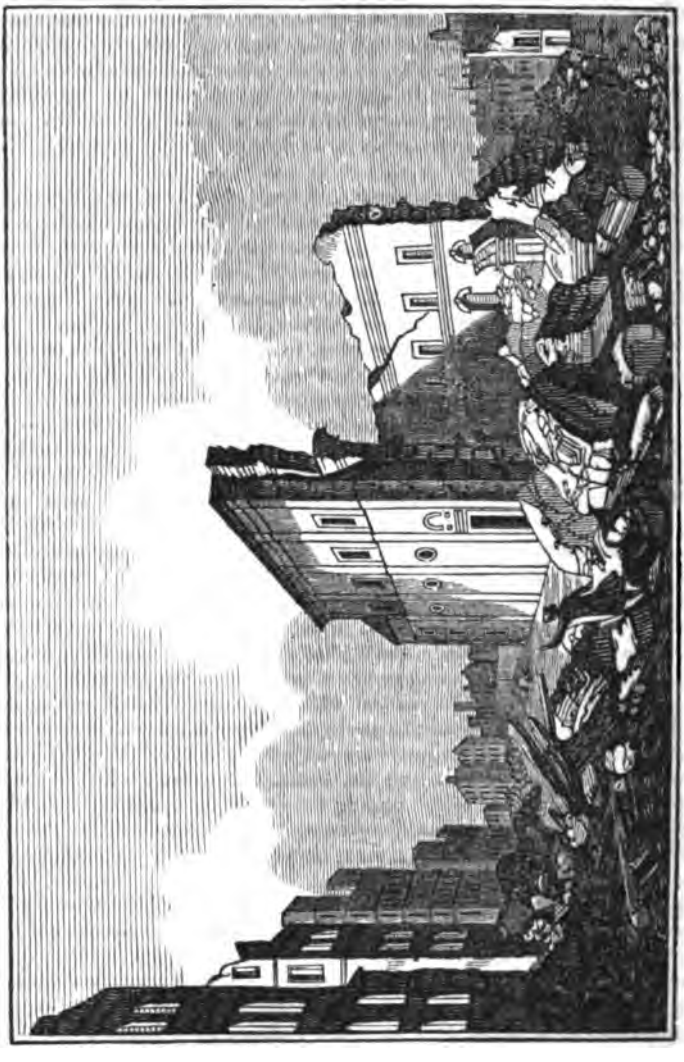
"This with some difficulty I accomplished, and here I found a prodigious concourse of people of both sexes, and of all ranks and conditions, among whom I observed some of the principal canons of the patriarchal church in their purple robes and rochets, as these all go in the habit of bishops; several priests who had run from the altars in their sacerdotal vestments in the midst of their celebrating mass; ladies half dressed, and some without shoes; all these, whom their mutual dangers had here assembled as to a place of safety, were on their knees at prayers, with the terrors of death in their countenances, every one striking his breast, and crying out incessantly, *Miserecordia meu Dios.*"

After some further description of this multitude, he proceeds thus :—

"As I thought it would be the height of rashness to venture back through the same narrow street I had so providentially escaped from, I judged it safest to return over the ruins of St. Paul's to the river side, as the water now seemed little agitated. From hence I proceeded with some hazard to the large space before the Irish convent of Corpo Santo, which had been thrown down, and buried a great number of people who were hearing mass, besides some of the friars; the rest of the community were standing in the area, looking with dejected countenances towards the ruins: from this place I took my way to the back street leading to the Palace, having the ship yard on one side, but found the further passage, opening into the principal street, stopped up by the ruins of the Opera-House, one of the solidest and most magnificent buildings of the kind in Europe, and just finished at a prodigious expense; a vast heap of stones, each of several tons weight, had entirely blocked up the front of Mr. Bristow's house, which was opposite to it, and Mr. Ward, his partner, told me the next day that he was just at that instant going out at the door, and had actually set one foot over the threshold, when the west end of the Opera-House fell down, and had he not in a moment started back, he should have been crushed into a thousand pieces."

At Oporto, near the mouth of the river Duero, the earthquake was felt at the same time as at Lisbon. The sky was very serene, when a dreadful hollow noise resembling thunder, or the rattling of coaches at a distance, was heard, and almost at the same instant the earth began to quake. In the space of two minutes the river rose and fell five or six feet, and continued to do so for four hours. At the commencement it ran with so much violence as to break a ship's hawser. In some parts the river opened, and seemed to discharge vast quantities of air. The agitation of the sea was so great, about a league beyond the bar, that air was supposed to have been discharged there also.

During the first shock, which was very terrible, the houses in the city were rocked as if in a convulsion, and every thing within shook and rattled to such a degree that the affrighted inhabitants ran into the streets, where the earth was



THE RUINS OF ST. PAUL'S:

From a print by Le Bas, published in 1757, after a drawing made on the spot.

evidently seen to heave up. At six o'clock in the evening another violent shock was felt. The only damage done was the overturning of a few pedestals from the tops of the churches, and the splitting of the walls of the decayed houses.

Saint Ubes, a seaport town about twenty miles south of Lisbon, was entirely swallowed up by the repeated shocks, and the vast surf of the sea. Huge masses of rock were detached at the same time from the promontory at the west end of the town, which consists of a chain of mountains containing fine pieces of different colors.

At Cadiz, a seaport of Spain, according to the report of Don Antonio d'Ulloa, the earthquake commenced at three minutes after nine in the morning of the first of November, and continued five minutes, the weather being at the time remarkably fine. It was, he observes, not inferior in violence to that which swallowed up Lima and Callao, in Peru, toward the end of October, 1746, and was nearly of twice the duration, the latter having been felt for three minutes only. That every thing here was not destroyed, appears to have been owing to the great solidity of the buildings. The water of the cisterns under ground was washed backward and forward, and was covered with great foam. The inhabitants, who had quitted the houses and churches, seeking safety in the open air, had scarcely recovered from their first terror, when they were plunged into a new alarm. At ten minutes past eleven o'clock, a wave was seen coming from the sea at the distance of eight miles, and at least sixty feet higher than usual. It dashed against the west part of the city, which is very rocky. Although its force was much broken by these rocks, it at length reached the walls, and beat in the breast-work, which was sixty feet above the ordinary level of the water, removing pieces of the fabric, of the weight of eight or ten tons, to the distance of forty or fifty yards. At half past eleven came a second wave; and this was followed by four others of equal magnitude. Others, but smaller, and gradually lessening, continued at uncertain intervals until the evening. A considerable part of the rampart was thrown down, and carried by the torrent above fifty paces. Several persons perished on the causeway leading to the Isle of Leon. The accounts brought to Cadiz reported that Seville had been much damaged, and that a similar fate had attended St. Lucar and Chiclana. Conil was said to have been destroyed; and, indeed, with the exception of the provinces of Catalonia, Aragon, and Valencia, the effects of this earthquake were felt throughout Spain.

At Madrid the shock was very sensibly felt soon after ten in the morning, and lasted five or six minutes. At first the inhabitants fancied they were seized with a swimming in the head; and afterward, that the houses were falling. In the situation the sensations were the same, and the terror so great that the people trod each other under foot in getting out. Those who were within the houses were still more affrighted, fancying every instant while the shock lasted that they were falling to the ground. It was not sensible to those who were in carriages, and very little so to foot passengers.

At Gibraltar it was felt about the same time as at Madrid, and began with a tremulous motion of the earth, which lasted about half a minute. A violent shock succeeded; and this again was followed by a second tremulous motion, of the duration of five or six seconds. Another shock, not so violent as the first, succeeded gradually; and the whole lasted about two minutes. Several of the guns on the battery were seen to rise, and others to sink, while the earth had an undulating motion. The greater part of the garrison and inhabitants were seized with giddiness and sickness; several fell prostrate; others were stupified; and many who were walking or riding became sick, without being

sensible of any motion of the earth. Every fifteen minutes the sea rose six feet, and then fell so low that the boats and small vessels near the shore were left aground, as were also numbers of small fish. The flux and reflux lasted till next morning, having decreased gradually from two in the afternoon.

In Africa this earthquake was felt almost as severely as it had been in Europe. A great part of the city of Algiers was destroyed. Many houses were thrown down at Fez and Mequinez, and multitudes were buried beneath their ruins. Similar effects were realized in Morocco. Its effects were likewise felt at Tangier, at Tetuan, at Funchal in the island of Madeira; and were it not that the barbarism of the African nations rendered it impossible to obtain information in relation to the subject, it is probable it would appear that all Africa was shaken by this tremendous convulsion. At the north it extended to Norway and Sweden; Germany, Holland, France, Great Britain, and Ireland were all more or less agitated by the same great and terrible commotion of the elements.

At sea the shocks of this earthquake were felt most violently. Off St. Lucar the captain of the Nancy frigate felt his ship so violently shaken, that he thought she had struck the ground, but on heaving the lead he found she was in a great depth of water. Captain Clarke, from Denia, in north latitude thirty-six degrees twenty-four minutes, between nine and ten in the morning, had his ship shaken and strained as if she had struck upon a rock, so that the seams opened, and the compass was overturned in the binnacle. The master of a vessel bound to the American islands, being in north latitude twenty-five degrees, west longitude forty degrees, and writing in his cabin, heard a violent noise, as he imagined, in the steerage; and while he was asking what the matter was, the ship was put into a strange agitation, and seemed as if she had been suddenly jerked up and suspended by a rope fastened to the mast-head. He immediately started up with great terror and astonishment, and looking out of the cabin window, saw land, as he took it to be, at the distance of about a mile. Coming upon the deck, the land was no more to be seen, but he saw a violent current cross the ship's way to the leeward. In about a minute this current returned with great impetuosity; and at a league's distance he saw three craggy-pointed rocks throwing up waters of various colors, resembling fire. This phenomenon, in about two minutes, ended in a black cloud, which had ascended very heavily. After it had risen above the horizon no rocks were to be seen, though the cloud, still ascending, was long visible, the weather being extremely clear. Between nine and ten in the morning another ship, forty leagues west of St. Vincent, was so strongly agitated that the anchors, which were lashed, bounced up, and the men were thrown a foot and a half perpendicularly up from the deck. Immediately after this, the ship sunk in the water as low as the main-chains. The lead showed a great depth of water, and the line was tinged of a yellow color, and smelt of sulphur. The shock lasted about ten minutes; but they felt smaller ones for the space of twenty-four hours.

In 1693, after several previous shocks, one occurred on the 11th of January, which, in three or four minutes, entirely destroyed the city of Catania, and 19.000 inhabitants of the island of Sicily; the undulations of this were felt, it is said, in Germany, France, and even in England. Fifty-four towns of some magnitude were more or less sufferers by this earthquake, and the total loss of human life amounted, it is supposed, to nearly 100,000.

The earthquake at Jamaica in the previous year, 1692, was still more dreadful: the earth rose and fell like waves of the sea, and hundreds of chasms were seen opening and closing alternately; many persons were swallowed up in

View of the City of Catania

these, infants crushed to death, with their bodies half out and half in them, and some, even after being buried alive, were cast out again with torrents of water. Three fourths of the buildings of Port Royal sank down with all their inhabitants under the water, and long after, the roofs and chimneys of many were perceivable at the distance of thirty and forty feet below the surface. A space of ground about a thousand acres in extent sank down during the first shock, the sea rolled over it, and a frigate then in one of the docks was washed by the waves over the tops of many buildings. On the north of the island, the plantations, which covered upward of a thousand acres, were swallowed up, and a lake appeared in their place; this afterward dried up, leaving nothing but sand and gravel, without a trace of a house or tree having ever occupied the spot. The chain of mountains which traverses the island presented the most fearful signs of the violence of the convulsion; they were almost entirely stripped of their verdure and their woods, which were brought down the rivers in such quantities, that several hundred thousand tuns of timber were seen strewed on the face of the deep.

Since the establishment of the Spaniards in Peru, the first earthquake in its capital happened in 1582; but the damage it did was much less considerable than that of some of those which succeeded. Six years after, Lima was again visited by an earthquake, the results of which were so dreadful, that it is still solemnly commemorated every year. In 1609, a third convulsion threw down many houses; and on the 27th of November, 1630, so much damage was done by an earthquake, that, in acknowledgment of the city not having been entirely demolished, a festival is also on that day annually celebrated. On the 31 of November, 1654, the most stately edifices in Lima, and a great number of houses, were destroyed by a similar event; but the inhabitants, having had timely presages, withdrew themselves from their houses, insomuch that few perished. In 1678, another dreadful concussion took place.

Among the most tremendous earthquakes with which the Peruvian capital has been visited, may be reckoned that which happened on the 28th of October, 1687. The first shock was at four in the morning, when several of the finest public buildings and houses were destroyed, with the loss of many lives. This was, however, merely a prelude to what followed: for two hours after, a second

shock was felt, with such impetuous concussions, that all was laid in ruins, and every description of property lost. During this second shock, the sea retired considerably, and then returned in mountainous waves, entirely overwhelming Callao, the seaport of Lima, distant five miles, as well as the adjacent country, together with the inhabitants. From that time, six other earthquakes were felt at Lima prior to that of 1746, which likewise happened on the 28th of October, at half past ten at night. The early concussions were so violent, that in the space of somewhat more than three minutes, the greater part, if not all, the buildings in the city were destroyed, burying under their ruins such of the inhabitants as had not made sufficient haste into the streets and squares, the only places of safety. At length the horrible effects of the first shock ceased; but the tranquillity was of short duration, the concussions swiftly succeeding each other. The fort of Callao was dilapidated; but what this building suffered from the earthquake was inconsiderable when compared with the dreadful catastrophe which followed. The sea, as is usual on such occasions, receding to a considerable distance, returned in mountainous waves, foaming with the violence of the agitation, and suddenly buried Callao and the neighboring country in its flood. This, however, was not entirely effected by the first swell of the waves; for the sea, retiring still further, returned with greater impetuosity, and covered not only the buildings, but also the lofty walls of the fortress; so that what had even escaped the first inundation, was totally overwhelmed by these succeeding mountainous waves. Of twenty-three ships and vessels of light burden then in the harbor, nineteen were sunk; and the four others, among which was a frigate named the San Firmin, were carried by the force of the waves to a considerable distance up the country. This terrible inundation extended, as well as the earthquake, to other parts of the coast, and several towns underwent the fate of Lima. The number of persons who perished in that capital within two weeks after the earthquake commenced, on an estimate of the bodies found, amounted to thirteen hundred, besides the wounded and maimed, many of whom survived their tortures but a short time.

The earthquakes in Sicily and in the two Calabrias began on the 5th of February, 1783, and continued until the latter end of the May following, doing infinite damage, and exhibiting at Messina, in the parts of Sicily nearest to the continent, and in the two Calabrias, a variety of phenomena. The part of the Calabrian provinces most affected by this heavy calamity lies between the thirty-eighth and thirty-ninth degrees of latitude, being the extreme point of the continent; and the greatest force of the earthquakes was exerted at the foot of the particular mountains of the Appenines, named Monte Deio, Monte Sacro, and Monte Caulone, extending westward to the Tyrrhene Sea. The towns, villages, and farm-houses nearest to these mountains, whether situated on the hills or in the plains, were totally ruined by the first shock, which happened about noon; and there the destruction of lives was the greatest. The towns still more remote were, however, greatly damaged by the subsequent shocks, particularly those of the 7th, 26th, and 28th of February, and that of the 1st of March. The earth was in a constant tremor, and its motions were various, being either vertical, horizontal, or oscillatory. This variety increased the apprehensions of the unfortunate inhabitants, who momentarily expected that the earth would open beneath their feet, and swallow them up. The rains had been continual and violent, often accompanied by lightning and furious blasts of wind. There were many openings and cracks in the earth; and several hills had been lowered, while others were quite level. In the plains, the chasms were so deep that many roads were rendered impassable. Huge mountains were severed, and portions of them driven into the valleys, which were thus

[illegible] up. The course of several rivers was changed, and many springs of water appeared in places which had before been perfectly dry.

In one place near Laureano, two tracts of land, situated in a level valley, were transported to the distance of a mile, with all their trees and olives still standing, and volumes of hot water and sand issued from the ground where they formerly stood; and two others, on which a part of the city of Polistena was built, were moved nearly across a contiguous ravine to about half a mile from their former positions, with some hundreds of houses on them, and many of the inhabitants, several of whom were extricated from the ruins alive and unhurt!

Fissure near Polistena.

Near Seminara, a large olive ground was precipitated to a distance of two hundred feet into a valley sixty feet in depth, and this so compactly as to leave unhurt a house with its inhabitants that stood on it, and the olive-trees continued to grow, and bore an abundant crop the same year in their new situation.

The permanent chasms or ravines caused by this earthquake were of great [illegible]: one in the district of Plaisano was a mile long, 105 feet broad, and 30 [illegible] deep; another three quarters of a mile long, 150 feet broad, and above 100 [illegible]; another was no less than 225 feet deep; one gulf at Fuscalano measured 70 feet square; and another about 750 feet square, and about 30 feet [illegible]. A mountain at the southern part of the peninsula was cloven for the [illegible] of nearly half a mile, the opening being of an irregular breadth of many [illegible].

From the city of Amantea, situated on the coast of the Tyrrhene Sea, in Lower Calabria, proceeding along the western coast to Cape Spartivento, in Upper Calabria, and thence along the eastern coast to Cape Alice, a part of Lower Calabria, on the Ionian Sea, the towns and villages, amounting to nearly [illegible], whether on the coast or inland, were either totally destroyed, or suffered greatly. At Canal Nuovo, the Princess Gerace and upward of four thousand of the inhabitants lost their lives. At Bagnara, the number of dead amounted to upward of three thousand; and Radicina and Palmi experienced a [illegible] loss. The total amount of the mortality occasioned by these earthquakes in Sicily and the two Calabrias was, agreeably to the official returns, thirty-[illegible] hundred and sixty-seven; but Sir William Hamilton thought [illegible] probable, and carries his estimate to forty thousand, including foreigners.

Along the seacoast of the straits of Messina, near the classical rocks of Scylla, the large masses, detached from the lofty cliffs, overwhelmed many

Circular Hollows in the Plains of Rosarno.

villas; the water, as usual, was violently agitated, and showed that the subterranean motion was not less active beneath the bed of the sea than on shore. The prince of Scylla, an old man, on the occurrence of the first shock, observing the effects produced on the cliffs, on which his own castle and the houses of the town were situated, advised the inhabitants to get boats ready, and to assemble on the shore, to be ready to escape in them if another shock should bring down the rock above them. They took his advice, and collected together on the shore accordingly. By the first shock, the sea had been raised and agitated so violently, that much damage had been done on the point of the Faro of Messina; but here it acted with still greater violence; for, during the night, an immense wave, which was falsely represented to have been boiling hot, and to have scalded many persons, on its rising to a great height, flowed furiously three miles inland, and swept off in its return two thousand four hundred and seventy-three of the inhabitants, with the prince at their head, who were either at that time on the strand or in boats near the shore.

The shocks felt since the commencement of these formidable earthquakes amounted to several hundreds; and among the most violent may be reckoned the one which happened on the 28th of March. It affected most of the higher part of Upper Calabria, and the inferior part of Lower Calabria, being equally tremendous with the first. Indeed, these shocks were the only ones sensibly felt in the capital, Naples. With relation to the former, two singular phenomena are recorded. At the distance of about three miles from the ruined city of Oppido, in Upper Calabria, was a hill having a sandy and clayey soil, nearly four hundred feet in height, and nearly nine hundred feet in circumference at its basis. This hill is said to have been carried to the distance of about four miles from the spot where it stood, into a plain called *Campo di Bassano*. At the same time, the hill on which the city of Oppido stood, and which extended about three miles, divided into two parts: being situated between two rivers its ruins filled up the valley, and stopped their course, forming two large lakes which augmented daily.

The accounts from Sicily were of a most alarming nature. The greatest part of the fine city of Messina was destroyed by the shock of the 5th of February, and what remained was greatly injured by the subsequent shocks. The quay in the port had sunk considerably, and was in some places more than a fathom beneath the water. The superb building called the Palazzata, which gave the port a more magnificent appearance than any other in Europe could boast, was entirely thrown down, and the lazaretto greatly damaged. The citadel suffered little, but the cathedral was destroyed, and the tower at the point of the entrance of the harbor much damaged. The wave which had done so much mischief at Scylla, had passed over the point of land at the Faro, and swept away twenty-four persons. The accounts from Melazzo, Patti, Terra di San Lucia, Cesaro, Reale, and from the island of Lipari, were very distressing; but the damages done there by the earthquakes were not so considerable as at Messina.

Sir William Hamilton, from the limited boundaries of these earthquakes, was persuaded that they were caused by some great operation of nature of the volcano Etna. To ascertain this, he began his tour by visiting the parts of the coasts of the two Calabrias which had suffered most from this severe visitation. He everywhere came to ruined towns and houses, the inhabitants of which were in shade, many of them built on such insalubrious spots that an epidemic had ensued. These unfortunate people agreed that every shock they had felt seemed to come with a rumbling noise from the westward, beginning usually with the horizontal motion, and ending with the vertical or whirling motion, which has had ruined most of the buildings. It had also been generally observed, that before a shock, the clouds seemed to be fixed and motionless; and that after a heavy shower of rain a shock quickly followed.

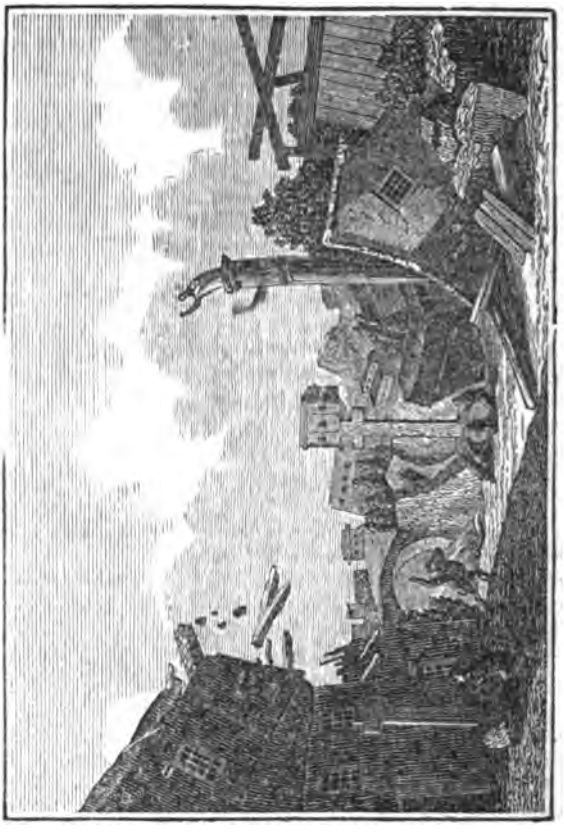
From Monteleone Sir William descended into the plain, and passed many towns and villages in a ruined state: the city of Mileto, lying in a bottom, was totally destroyed, without a house standing. Among the many examples afforded by these earthquakes of animals being able to live a long time without food, was that of two hogs, which had remained buried under a heap of ruins a Sorano for forty-two days, and were dug out alive.

In every ruined town he visited an interesting remark was made to him, namely, that the male dead were generally found under the ruins in the attitude of struggling against the danger, but that the attitude of the females was usually with the hands clasped over the head, as if giving themselves up to despair, unless they had children near them: in this case they were always found clasping them in their arms, or in some attitude which indicated their tender care to protect them. How striking an instance of maternal tenderness!

Having walked over the ruins of Oppido, Sir William descended into the ravine, which he carefully examined. Here he saw the wonderful force of the earthquake, which had produced exactly the same effects as in the ravine of Terra Nova, but on a scale infinitely greater. The enormous masses of the rock detached from each side of the ravine lay in confused heaps, forming real mountains, and, having stopped the course of two rivers, great lakes were formed.

The Prince of Carlat showed him two girls, one of the age of about sixteen years, who had remained eleven days without food under the ruins of a house in Oppido, and the other, about eleven years of age, who had been under the same circumstances six days, but in a very confined and distressing posture.

Sir William describes the port of Messina and the town in their half-ruined state, when viewed by moonlight, as strikingly picturesque. On landing, he was assured by natural fishermen, that during the earthquake of the 5th of February, at night, the sand near the sea was hot, and that in many parts they



RUINS OF MESSINA.

saw fire issue from the earth. This had often been repeated to him in the Calabrian plain.

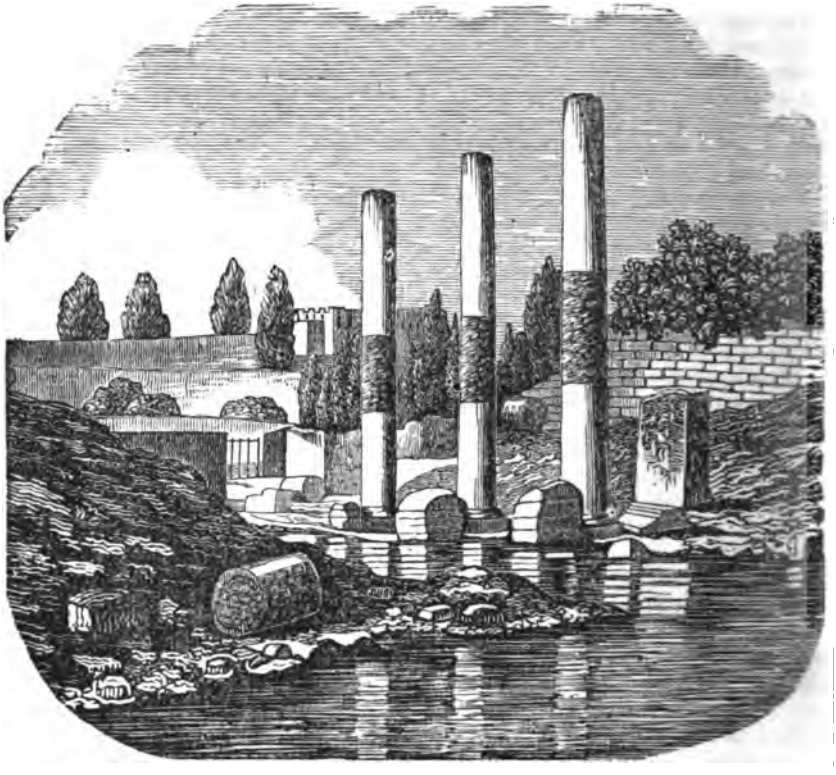
The force of the earthquakes, although very violent at Messina, and at Reggio, on the opposite side of the strait, was not to be compared to that which was felt in the plain. In the former city the mortality did not exceed seven hundred, of a population of thirty thousand. A curious circumstance happened there, also, to prove that animals can sustain life for a long time without food. Two mules belonging to the Duke of Belviso remained under a heap of ruins, the one twenty-two and the other twenty-three days: for some days after they refused their food, but drank plentifully, and finally recovered. There were numberless instances of dogs remaining many days in the same situation; and a hen, belonging to the British vice consul, having been closely shut up beneath the ruins of his house, was taken out on the twenty-second day, and recovered, although at first it showed but little signs of life: like the mules, it did not eat for some days, but drank freely. From these instances, and from those above related, of the girls at Oppido, and the hogs at Soriano, as well as from several others of the same kind, it may be concluded that long fasting is always attended with great thirst, and a total loss of appetite.

The commandant of the citadel of Messina assured him that on the fatal 5th of February, and the three following days, the sea, at the distance of about a quarter of a mile from that fortress, rose and boiled in a most extraordinary manner, and with a horrid and alarming noise, while the water in the other parts of the Faro was perfectly calm. This appeared to him to point out exhalations or eruptions from cracks at the bottom of the sea, which were probably made during the violence of the earthquakes; and to these phenomena he ascribes a volcanic origin. He thus attempts to explain the nature of the formidable wave which was represented as boiling hot, and which, as has been already noticed, was so fatal to the inhabitants of Scylla.

Spallanzani, who visited Messina nearly six years afterward, found the city still a mass of ruins, and the streets, except some of the principal ones, impassable; the inhabitants had begun to rebuild their dwellings, and that on an improved plan, better calculated to obviate the effects of such another visitation; but even at that distance of time, he describes them as hardly recovered from their consternation, and still chiefly residing in the temporary wooden sheds they had erected in the neighborhood for shelter after the catastrophe.

Our readers will not be sorry to have this catalogue of horrors interrupted by an account of a curious induction made by men of science from some facts which might not appear worthy of notice to common observers, but yet lead to very convincing proofs of effects, of the causes of which no other records are handed down to us.

An examination of the Bay of Baiæ had led to a conclusion that an elevation of this coast to a height of twenty feet had been produced by some earthquake, at no very remote period; but the evidence of this was not so conclusive as to induce all to acquiesce in the opinion. The remains of an ancient building commonly called the Temple of Serapis, however, furnished the deficient corroboration of this fact. These ruins were not discovered till 1750, on the removal of some rubbish and bushes which had, till then, partly concealed them from observation. They were found to constitute part of a splendid edifice, the pavement of which was still preserved. It had been of a quadrangular form, and the roof supported by forty-six columns of granite, or marble, remains of which were lying on the ground, and three only left standing, which are forty-two feet in height. To the distance of about twelve feet from their bases the surface of these is quite smooth and uninjured; above, for another



REMAINS OF THE TEMPLE OF SERAPIS, AT PUZZUOLI.

space of twelve feet, the marble has been pierced and corroded by a species of shell-fish well known, the remains of which are found at the bottoms of the perforations they had made; and the depth and size of these proved that the columns had been long exposed to their attacks. Hence it appeared, that while the lower part of these pillars had been protected by being buried in rubbish or earth, the sea had surrounded them to a depth of twelve feet at least; and the upper part, having been exposed to the air, was weather-worn accordingly. The columns which are overturned on the floor of the building, are corroded in the same way in parts which had been exposed to the sea-water, and consequently to these animals. But as the temple could not, for obvious reasons, have been originally built in the sea, it must have sunk down after its construction, from the effects of an earthquake; and after continuing thus partly submerged for a length of time, another convulsion must have elevated its ruins again; so that at present its pavement is raised about a foot above the level of the sea. And other ruins in the neighborhood, besides two Roman roads, which are still visible beneath the waters, confirm the fact of the subsidence, though these have not been re-elevated, as the temple has.

South Carolina was shaken by earthquakes in 1811, which continued till the destruction of the Caraccas, in the following year. The valley of the Mississippi, from New Madrid to the mouths of the Ohio and St. Francis, was convulsed to such a degree as to cause the formation of several large lakes and islands. A tract of country many miles in extent, near the Little Prairie, on that river, was covered with water three or four feet deep; and when this disappeared, it left a plain of sand: some of the lakes were twenty miles in extent, and were formed in the course of an hour; and others were as rapidly drained. The burial ground at New Madrid was precipitated into the river; and the inhabitants of that city state that the earth rose in great waves, which, when they had reached a fearful height, burst, and volumes of water and sand were thrown up into the air to the tops of the trees. Seven years afterward, the remains of hundreds of these fissures were still to be seen. On this occasion, a degree of presence of mind was shown by the people rarely met with; and the more remarkable, because experience had not inured them to such events. They observed that these chasms in the ground ran from S. W. to N. E.; they accordingly cut down large trees, so that they might fall at right angles to this direction, and stationed themselves on the trunks: by this expedient of a bridge, as it were, they were preserved from being swallowed up by fissures which opened repeatedly beneath them.

EARTHQUAKES IN SOUTH AMERICA.

On the 26th of March, 1812, at five in the afternoon, after a calm but excessively sultry day, a tremulous motion in the ground was felt at Caraccas, sufficiently strong to set the church-bells ringing; this lasted five or six seconds, and the earth continued undulating like the sea in a calm for ten or twelve more: subterranean noises were then heard, and electric discharges perceived, more powerful than those during an average thunder-storm; and the agitation of the earth increased to such a degree, both of the oscillating and horizontal kind, that in the short space of a minute, the whole city, with upward of thirty other towns, and numerous villas, farms, and other buildings in the adjacent country, to an extent of 300 square miles, were completely overturned, and

80,000 persons killed, and thousands more wounded. This city stood at the foot of the declivity of the highest mountain in that country, called La Silla, and on the margin of an immense plain, through which several rivers flowed; it was elevated considerably above the level of the sea, and enjoyed a remarkably fine climate. The day of this awful catastrophe happened to be Good Friday, and the people were crowded in the churches, beneath which they were buried by thousands; two of these, La Trinidad and Alta Gracia, in the immediate neighborhood of the mountain, experienced most forcibly the effects of the shock; they were upward of 150 feet in height, and no portion of their ruins exceeding five or six feet high were left standing.

As soon as the first panic was over, the survivers set to work to rescue those who lay buried in the ruins and yet lived, or to collect the bodies of the dead for burial; but these were too numerous to admit of being interred, and, in order to avoid a pestilence from the decaying corpses, they were obliged to be burnt in piles with the timber from the ruins.

In such a country, the want of water was soon experienced as a great aggravation of the evil; for all the cisterns and conduits were ruined, and the springs and rivulets either dried up or diverted from their course. Hunger was next added to the other calamities; no provisions were saved, and none were brought to market, and many persons absolutely died for want of food.

The shocks continued for many months; some so violent as to rend several mountains asunder, frequently occurring at intervals of only five minutes for days together, and that was thought a very tranquil one on which *only* fifteen or twenty were experienced.

It is curious to remark the effects of such a calamity on the human mind, according as it is influenced by remorse or fear. In less than two days after the first blow, two thousand individuals were married who had previously lived in unhallowed union. Many poor relations who had hitherto been neglected, were sought for and acknowledged by their wealthy kindred; neglected children were owned, and legitimate restitutions made, and law-suits terminated; while the timid and the depraved accused themselves of concealed crimes,—owning murders they had committed; others rushed to fresh excesses, and to the perpetration of new enormities.

In an era less remarkable, a mere convulsion of nature would have had no influence on a new government; but, notwithstanding the prosperity Venezuela then enjoyed, the seeds of discontent had fallen on one class of the community. The principles which formed the basis of the new constitution were democratical, and it had been necessary to deprive the clergy of some of their privileges, which of course created enmity in their minds to the present government. Immediately after the earthquake, the priests proclaimed that the Almighty condemned the revolution: they denounced his wrath on all who favored it; and a counter-revolution, attended by great bloodshed, was the consequence.

An earthquake commenced in Chili on the 19th of November, 1822, the first shocks of which were felt at the same moment over a distance of 1200 miles, and the coast, for a length of 100 miles from Valparaiso, was raised more than three feet above its former level; part of the bed of the sea remained dry at high water, and there is reason to believe that a permanent change of surface, with respect to elevation, was effected over 100,000 square miles. The shocks continued to the end of the ensuing September, and, even at that distance of time, two days never passed without one, and often two or three were felt in the course of twenty-four hours.

The following account of the effects experienced on this occasion is narrated by Mrs. Graham, in her *Journal of a Residence in Chili*, and conveys a vivid

idea of such an event; the authoress was at Quintero, about thirty miles from Valparaiso:—

"*November* 29th.—Yesterday, after dinner, Glennie having fallen into a sound sleep in his arm-chair by the fireside, Mr. Bennet and I, attracted by the fineness of the evening, took our seats in the veranda, overlooking the bay; and, for the first time since my arrival in Chili, I saw it lighten; the lightning continued to play over the Andes until after dark, when a delightful and calm moonlight followed a quiet and moderately warm day. We returned reluctantly to the house on account of the invalid, and were sitting quietly conversing, when, at a quarter past ten, the house received a violent shock, with a noise like the explosion of a mine; and Mr. Bennet starting up, ran out, exclaiming, 'Au caribquake, au caribquake! for God's sake, follow me!' I, feeling more for Glennie than anything, and fearing the night air for him, sat still; he looking at me to see what I would do, did the same; until the vibration still increasing, the chimneys fell, and I saw the walls of the house open. Mr. Bennet again cried from without, 'For God's sake, come away from the house!' So we rose and went to the veranda, meaning of course to go by the steps; but the vibration increased with such violence, that hearing the fall of a wall beside us, we jumped down from the little platform to the ground, and were scarcely there, when the motion of the earth changed from a quick vibration to a rolling like that of a ship at sea, so that it was with difficulty that Mr. Bennet and I supported Glennie. The shock lasted three minutes; and by the time it was over, everybody in and about the house had collected on the lawn, excepting two persons, one the wife of a mason, who was shut up in a small room which she could not open, and the other Carillo, who, in escaping from his room by the wall which fell, was buried in the ruins, but happily preserved by the fund falling across him.

"Never shall I forget the horrible sensation of that night! In all other convulsions of nature, we feel or fancy that some exertion may be made to avert or mitigate danger; but from an earthquake there is neither shelter nor escape. The sad 'disquietude' that agitates every heart, and looks out in every eye, is too awful to be described. Amid the noise of the destruction before and around us, I heard the lowings of the cattle all the night through; and I heard the screaming of the sea-fowl, which ceased not till morning. There was not a breath of air, yet the trees were so agitated that their topmost branches seemed on the point of touching the ground. I got a man to hold a light, and venture with me in the inner rooms to fetch medicine. A second and a third shock had by this time taken place, but so much less violent than the first, that we had reasonable hopes that the worst was over, and we proceeded through the ruined sleeping-rooms to cross the court where the wall had fallen; and as we reached the top of the ruins, another smart shock seemed to roll them from under our feet. At length we reached the first door of the sleeping-apartments, and on entering, I saw the furniture displaced from the walls, but paid little attention to it; in the second, however, the displacing was more striking, and then it seemed to me that there was a regularity in the disposal of everything; this was still more apparent in my own room, but it seemed in all to have been moved in the same direction. The night still continued serene, and though the moon went down early, the sky was light, and there was a faint aurora-australis. It was now twelve o'clock; the earth was still at unrest, and shocks accompanied by noises like the explosion of gunpowder, or rather like those accompanying the jets of fire from a volcano, returned every two minutes; and then, whether not, I fell asleep; but a little before two, a loud explosion and a tremendous shock roused every one, and a horse and pig broke loose, and came

to take refuge among us. At four o'clock, there was another violent shock, and the interval had been filled with a constant trembling, with now and then a sort of cross motion, the general direction of the undulation being north and south. Since that hour, though there has been a continued series of agitations, such as to spill water from a glass, and though the ground is still trembling under me, there has been nothing to alarm us. At daylight, I went out of the tent to look at the earth; the dew was on the grass, and all looked beautiful as if the night's agitation had not taken place. Half past eight, P. M., the evening is as fine as possible, the moon is up, and shines beautifully over the lake and the bay, the stars and the aurora-australis are also brilliant, and a soft southerly breeze has been blowing since daylight.

"*Thursday, November* 21.—At half past two, A. M., I was awoke by a severe shock; at ten minutes before three, a tremendous one, which made us feel anew that utter helplessness which is so appalling. Five others in the course of the day, of different degrees of severity, were all that were in any degree alarming, but slight ones occurred every twenty or thirty minutes. I learn, not one house in the port remains habitable, though many retain their forms. There is not a living creature to be seen in the streets, but the hills are covered with wretches driven from their homes, whose mutual fears keep up mutual distractions. The ships in the harbor are crowded with people; no provisions are to be had; the ovens are ruined, so that the bakers cannot work. We had the same prophecy of a greater shock; that it did not happen has been attributed to the interposition of our Lady of Quintero, who has a chapel at the old house, and her image has long been an object of peculiar veneration. All the women of the neighborhood flocked thither on the first dreadful night, and with shrieks, cries, and endearing names, entreated her to come to their assistance: in the morning, when the priests were able to force the doors, obstructed by the fallen rubbish, they found her prostrate, with her head off, and several fingers broken. She was soon restored, however, to her pristine state, dressed in clean clothes, and placed in the attitude of benediction before the door of her shattered fane.

"Don Fausto reports from Quillota, that the 19th being a festival of St. Martin, the tutelary saint, the market-place was crowded with people, and booths, and bowers of roses and myrtles; under which all kinds of feasting, revelling, dancing, fiddling, masking, and every species of dissipation, or rather dissoluteness, was going on. The earthquake came!—and in an instant all was changed. Instead of the sounds of the viol and the song, there arose a cry of '*Misericordia!*' and a beating of the breast, and a prostration of the body: the thorns were platted into crowns, which the sufferers pressed on their heads till the blood streamed down their faces, the roses being now trampled under foot. Some ran to their falling houses to snatch thence their children, forgotten in the moment of festivity, but dear in danger. Among the rest, came Don Duenas: he had been in his house with his wife and child; he could not save both at once; and while he was bearing her out, the roof fell, and his infant was crushed. His loss of property had been immense. This man then, with this load of affliction, came to Fawkner (deputy governor), and told him he had ordered already four bullocks to be killed and distributed to the poor; and desired him to remember, that though his losses had been severe, he was still comparatively a rich man, and therefore able, as well as willing, to assist his neighbors and fellow-sufferers."

EARTHQUAKE IN THE ISLAND OF HAYTI.

The following account of one of the most disastrous earthquakes on record, was written by an eye-witness of the scene:—

"On the 7th of May, 1842, the island of Hayti was visited with an earthquake, which, in its destructive effects, has proved to be the severest ever known. The weather had been for many days excessively hot and sultry, the temperature varying from 92 to 95 degrees in the shade, and 110 degrees when exposed to the solar rays. The winds were hot, parching, and unrefreshing, and the drought had been for some time prevailing. In the afternoon of that day, at about half past five o'clock, I was standing on the square, which is situated on an elevated part of this town (Port au Platte.) The sky was uncommonly serene, and the descending sun promised to be bright and glorious in its setting. Just then, casting my eyes toward Mount Isabella, which overlooks the town, I perceived a dark vapor ascending and enveloping its base and sides; a rolling, rumbling sound immediately succeeded, and instantaneously came a shock which nearly dashed me to the ground. The level of the square appeared undulated like the waves of the sea—a faint and sickly sensation came over me, and dizziness and difficulty of breathing. The houses rocked to and fro like vessels in a storm. The ground was rent in various parts. Many persons were thrown down by the violence of the concussion—others were reeling as if in a state of drunkenness.

"A second shock followed, yet stronger than the former, accompanied by the same appearances, effects, and terrors. The church, a strong and massive building, seemed tottering to its fall; the bricks flew from the solid masonry as if from projectiles; wide fissures appeared in the walls and arches, and the whole would have been levelled but for the strength of the outside buttresses and the lowness of the building. It was affecting to hear the terrific cries and lamentations of the women and children, and instructive to contemplate even their lowly prostration to the Divinity—imploring his mercy, aid, and succor in their distresses. The second shock must have lasted about 60 seconds.

"Fortunately for us, our town is almost entirely constructed of wood, which thus becomes for its preservation. The stone buildings suffered materially, and some of the finest were entirely destroyed. From the 7th up to the present day we have been in a continued state of alarm—upward of forty shocks having taken place during that interval, some more or less severe. Processions and prayers are continually on foot to avert, if possible, the Divine displeasure. The most wear serious and solemn looks; the women, when not in the processions, are sitting at the doors of their houses, either in tears or with books of prayer. Business is not even thought of, such is our state of agitation.

"The fine town of Santiago, about sixty miles distant in the interior, and the centre of our agricultural commerce in this part, has been entirely destroyed. The population consists of about 6000 souls, of which 500 are buried in the ruins. During the earthquake, the inhabitants rushed into the Roman Catholic church to implore mercy from the Most High, and filled it to overflowing; and when it fell, rivers of blood were seen to pour through the ruins, proceeding from the bodies of the unfortunate victims crushed within.

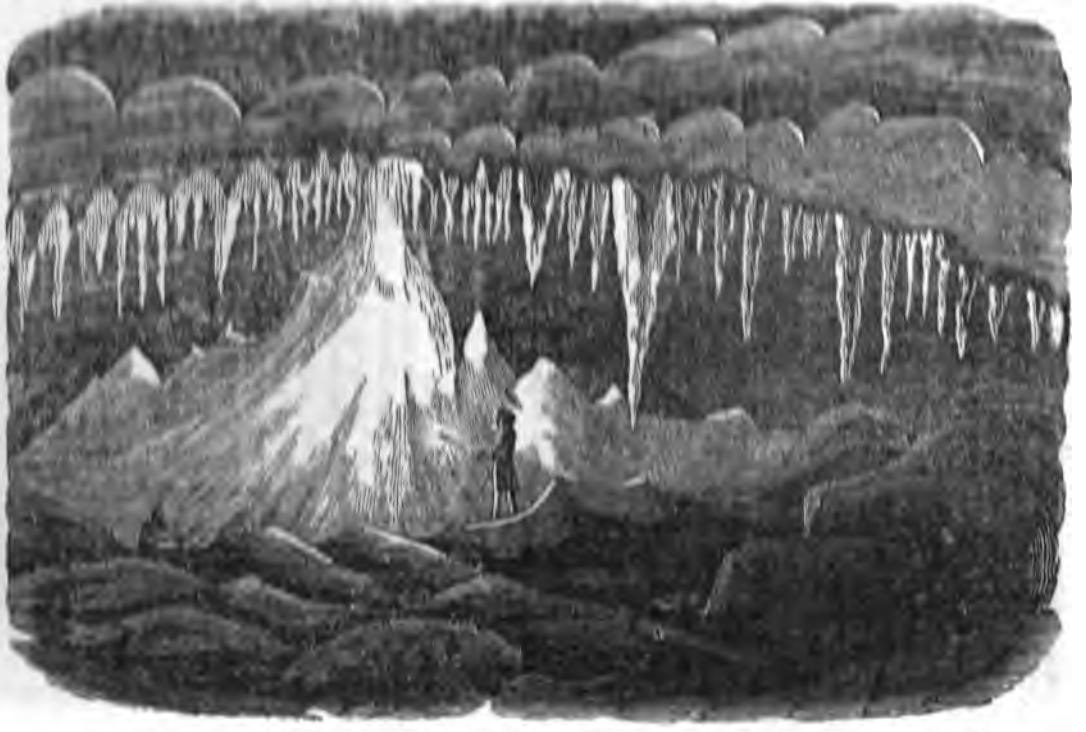
"The city of Cape Haytien, the deposite of all the agricultural products of the fine plain, the capital of the northern part of the island, the first city of Hayti for the beauty and solidity of its buildings, and the second only in size and importance, has met with utter destruction, and is one immense mass of crumbling ruins.

"A gentleman who left immediately after the disaster, informed me that so sudden had been the catastrophe, that hardly three seconds were allowed to escape from the houses. The shock commenced at five o'clock, P. M., and in two minutes the destruction of the city was complete. The sea rushed into the principal streets, and suddenly receded, carrying with it masses of ruins. The entire population was estimated at from 10 to 12,000, and from the best information that could be obtained from the survivers, not more than 2000 are supposed to have escaped alive. Cries of agony and shrieks would now and then proceed from the ruined buildings, and break the solemn stillness of the night. Many dead and putrefied bodies were lying in the streets, and nobody to remove them; the air was tainted with the infection, and a pest seemed quietly settling over the city.

"In Cape Haytien, the horrors of pillage were added to those of the earthquake. The hour being that in which the inhabitants were preparing for their evening meal, the falling in of the roofs and rafters scattered the fires, which seized upon them, and in an incredibly short space of time the whole woodwork of the city was in flames. By eight o'clock, the country people poured into the city, armed with machettes, knives, and guns, and commenced the work of pillage and murder, killing every one who offered any resistance to their depredations. The houses and stores of the few whites and principal merchants were the first to be attacked: these were soon sacked, and everything in the shape of moveable property that was not covered up in the ruins was taken possession of. Bands of eight or ten of the plunderers would meet in the streets and contend for the spoils, frequently leaving on the ground half their number dead or desperately wounded.

"Such a scene, as I am informed by those who witnessed it, was scarcely ever beheld. Beneath the ruins the cries of the wounded and dying for succor were heard in vain, and in many cases four days elapsed before any efforts were made for their extrication. One person was brought out alive who had lived fifteen days under a bed of wall. Every merchant that could escape made for the shipping, where upward of one hundred were crowded into four vessels.

"The survivers sleep in the country, in the fields, none daring to trust themselves as yet under any cover. The stench from the corrupted bodies was such that at one time it was feared some pestilence would break out; but the fire and the limestone (which the heat has converted into quicklime) are daily purifying the air. The destruction of life and property has been terrible, and it will yet be some time ere the people can sufficiently overcome their fears to make any attempt to clear away the ruins, or return to the places where their happy homes so recently stood."



KINGSTON CAVE.

CAVERNS.

KINGSTON CAVE.

[See page 73.]

Some years since, a poor man of the name of Gorman, residing on the estate of the Earl of Kingston, near Burnt Court, in the county of Tipperary, about midway between Caher and Mitchelstown, while quarrying stones on part of his little farm, observed that several of the smaller pieces slipped through a fissure in the rock, and disappeared. From the long known fact of a very extensive cavern being in the immediate neighborhood, he was led to suppose that this aperture communicated therewith; and on widening it sufficiently to allow him to pass, he went down, provided with a light, &c. Finding the place far more extensive than was anticipated, he was induced to prolong the examination until his light failed, leaving him in total darkness: from this predicament he was at length relieved by some of his family and neighbors, who became uneasy by his long absence. This cave has since been visited by several persons of respectability, whose report goes far to place it, in point of magnificence, before any cavern in the United Kingdom of which we have an account.

On entering through an opening just sufficient to allow you to pass, you come to a large space, and thence descend for thirty or forty feet down an inclined plane, and into a sort of angle formed by the roof and floor, (which approach quickly to each other, and join a few feet lower down.) You are soon obliged to slide down the rest of this slope, so contracted has the space overhead become, and when at the bottom, have to work yourself to the right hand in a reclining position. After progressing some time in this manner, with considerable difficulty, you arrive suddenly at the edge of a fearful chasm, which threatens to put an end to all further proceeding. At length, when the eye becomes a little used to the gloom of the place, the top of a ladder is discovered, appearing just above the brink of a dark and apparently unfathomable abyss; with some considerable exertion you gain a footing on the ladder; descending with cautious steps about twenty feet, you land on a very rugged bottom, covered with large rocks. The lights being now prepared, and each adventurer and guide furnished with one, you proceed in a position varying between *stooping and creeping on "all fours"* for a long way, until the roof becomes of sufficient height to allow your standing upright. Hitherto there is little, if any thing, to interest—all being dark and gloomy, and the black looking limestone rocks being nearly bare—but from hence the beauties of the place begin to show themselves; first in the form of "stalactites," occurring here and there, while in the bottom are discovered fine incrustations of spar, interspersed with "stalagmites" in endless variety. As you proceed, the scene becomes more and more interesting, the rocks being covered in many places with brilliant spar; from the roof also depend thousands of stalactites, many of the larger of which (as seen in our engraving) having in process of time joined the stalagmites below, assume the appearance of pillars and their bases widely extended. You also meet with occasional magnificent specimens, having the appearance of

drapery, and hanging from the roof of the projecting rocks in the most graceful folds, the effect of which, on placing a light behind, is splendid beyond description. The cavern soon branches out in various directions, and the further you proceed, the more perfect and interesting are its beauties. In one long hall or passage, vaulted at the top, a curtain hung down which filled up the way completely, and prevented further access, until a small aperture was broken in it in order of creeping through. In another of these halls or galleries, a curtain hung gracefully down at one side, occupying nearly half of the opening. After such rain, the bottom is in many places very wet; but even these spots have their beauties, for, in the pools thus formed, some of the most elegant crystallisations are going forward. The opening in this cavern is situated about a quarter of a mile N. E. of the entrance of the long known and remarkable cave of Thunderingtoke, on the lands of Skrhemartinka, and in the same hill side, but does not appear to communicate with it, extending below in nearly an easterly direction. It is on the estate of the Earl of Kingston, and has been visited by Lord Kinsborough, who has directed that the spars, &c. shall be preserved from injury. It is difficult to form an accurate estimate of distance or space under the circumstances which attend a visit to this place, yet it may be conjectured that the cave extends from a quarter to half a mile in some directions, and probably much further, as a large portion of it remains still unexplored. The height of the roof is, in some places, from twenty to thirty feet.

CAVERN OF THE GUACHARO.

Baron Humboldt, in his *Personal Narrative*, gives an account of a remarkably interesting cavern, in the province of New Andalusia, about three short leagues from the convent of Caripe, and called the Cavern of the Guacharo. A narrow path led the travellers across a fine verdant plain, when they turned eastward, and were guided by a small river which issues from the mouth of the cave. During three quarters of an hour, they continued to ascend, sometimes walking in the water, and sometimes between the torrent and a wall of rocks, by a path rendered slippery and fatiguing by masses of earth and trunks of fallen trees, which they had to surmount. On a sudden turn of the road, which winds like the stream, they found themselves before the immense opening of the grotto. Baron Humboldt states that the aspect of the place was majestic even to an eye accustomed to the picturesque scenery of the Alps; he had visited the Peak Cavern in Derbyshire, and was acquainted with the different caves of Franconia, the Hartz and Carpathian mountains, and the uniformity generally observable in all those, led him to expect a scene of a similar character in that which he was about to visit; but the reality far exceeded his expectations, for, if the structure of the cave, and the variety and beauty of the stalactites, resembled those he had elsewhere witnessed, the majesty of tropical vegetation gave an individual character and indescribable superiority to the entrance of the Cavern of the Guacharo.

The entrance is a vaulted arch, eighty feet broad and seventy-two feet high; the steep rock that surmounts this opening is covered with gigantic trees, intwined with creeping and climbing plants and shrubs, brilliant with blossoms of the finest colors, and the most varied forms. These form natural festoons which hang before the mouth of the cave, and are gently agitated by the passing currents of air. What a contrast between such a scene and the gloomy entrances of the caverns of northern climes, crowned with oaks and sombre larches!

But this luxuriant vegetation was not alone confined to the exterior; the traveller, on following the banks of this subterranean stream into the grotto, beheld them with astonishment, adorned for thirty or forty yards with the Praga palm-tree, plantain-leaved heliconias, eighteen feet high, and arms that resembled trees in their size!

It was not found necessary to light their torches till they had reached the distance of 430 feet, owing to the continuous direction of the cavern, which allows the light of day to penetrate thus far; and when this began to fail, the hoarse cries of the nocturnal birds, whence the place derives its name and celebrity, began to be audible from a distance. The Guacharo is about the size of a common fowl, and resembles in form the vulture tribe, with a beak surrounded by stiff hairs; its plumage is of a dark bluish gray, mixed with small streaks of black; white large heart-shaped spots, bordered with black, mark the head, wings, and tail; it is strictly a nocturnal bird, and is almost the only one which does not prey on animals, its food being fruits. The shrill, discordant noise made by thousands of these birds, brought from the inmost recesses of the cave, and reverberated from the arched roofs, forms a clamor of which it is impossible to form an idea. Their Indian guides, by fixing torches to the ends of long poles, showed travellers the nests of the bird, which were constructed in funnel-shaped holes, with which the roof of the grotto was pierced in all directions, and generally at about sixty feet above their heads.

There is an annual destruction of these birds by the Indians, who obtain from their young an oil much used in that country. They bring down their nests by means of long poles, and many thousands of the old birds are killed while endeavoring to defend their helpless progeny; they keep hovering over the heads of their enemies, uttering the most discordant cries. The young that fall with the nests are immediately opened, and a thick layer of fat that is found in their intestines is melted down in pots of clay, and is known by the name of guacharo butter; (Manteca or Aceite;) it is half liquid, transparent, without smell, and may be kept a year without becoming rancid, and, according to the Baron, who ate it at the convent, where no other oil is used, it imparts no disagreeable taste or smell to the food dressed with it. The habits of the bird, excluded from daylight, using little exercise, and feeding on vegetable food, account for the production of this quantity of fat in a manner analogous to that in which geese and oxen are known to become large by similar modes of treatment; the quantity of this oil obtained, bears but a small proportion to the carnage thus made annually by the hunters; they do not obtain more than 150 or 160 bottles, of about sixty cubic inches each, of pure *manteca*; the rest, which is less transparent, is kept in earthen vessels.

There are two causes why this destruction of the birds at the *oil-harvest*, as it is termed, has not extirpated the race; one is, that the Indians are prevented by superstition from penetrating very far into the interior of the cavern, and the other that the neighboring caverns, too small to be penetrated by man, afford a place of security to them to breed and multiply in; at least it appears that no perceptible diminution of their numbers has been observed.

The travellers, in continuing to explore the cave, followed the banks of the stream which issues from it, and is from twenty to thirty feet wide; they pursued this course as far as the hills formed of the calcareous depositions admitted. When the torrent wound among high masses of stalactites, they were often obliged to descend into the bed of the stream, which is only about two feet in depth; on its banks they observed great quantities of palm-tree wood, the remains of trunks the Indians made use of to climb to the nests which they could not otherwise get down.

Still pursuing the course of the river, the cavern preserving the same width and height to the distance of 1458 feet from the mouth, the travellers, on turning round, were struck with the singularly beautiful appearance which a hill covered with the richest vegetation, immediately fronting the entrance of the grotto, presented; this, brilliantly illuminated by the sun's rays, and seen through the vista of the dark cave, formed a striking contrast to the surrounding obscurity; while the large stalactites depending from the roof were relieved against the luminous back ground of verdure. After surmounting, with some difficulty, an abrupt rise in the ground where the stream forms a small cascade, they found that the cave diminished in height to forty feet, but retained its original direction; here a blackish mould was found, either brought by the rivulet, or washed down from the roof by the rain water, which penetrates the crevices of the rock; and in this, to the delight of the travellers, they found seeds growing, which had been brought thus far into the cave by the birds, but so altered by the deprivation of light, that they could not even recognise the species of plant thus produced under such unfavorable circumstances. It was found impossible to persuade the Indian guides to advance further; the cries of the birds, rendered still more horrible by the contraction of the cave, had such an effect on their minds, that they absolutely refused to proceed; and, to the regret of Humboldt and his friend, they were compelled to retrace their steps.

WEYER'S CAVE.

Weyer's Cave is situated near the northern extremity of Augusta county, Virginia, seventeen miles northeast of Staunton, on the eastern side of a ridge running nearly north and south, parallel to the Blue Ridge, and somewhat more than a mile distant from it.

The western declivity of this ridge is very gradual, and the visiter, as he approaches from that direction, little imagines from its appearance that it embowers one of nature's masterpieces. The eastern declivity, however, is quite precipitous and difficult of ascent.

The guide's house is situated on the northern extremity of this ridge, and is distant eight hundred yards from the entrance of the cave. In going from the house to the cave you pass the entrance of Madison's Cave, which is only two hundred and twenty yards from the other. Madison's Cave was known and visited as a curiosity long before the discovery of Weyer's, but it is now passed by and neglected, as unworthy of notice compared with its more imposing rival, although it has had the pen of a Jefferson to describe its beauties.

Let me remark here, that the incurious visiter, who goes because others go, and is but slightly interested in the mysteries of nature, may retain his usual dress when he enters the cave which I am attempting to describe; but if he is desirous of prying into every recess, climbing every accessible precipice, and seeing all the beauties of this subterraneun wonder, I would advise him to provide himself with such habiliments as will withstand craggy projections, or receive no detriment from a generous coating of mud.

The ascent from the bottom of the hill to the mouth of the cave is steep, but is rendered less fatiguing by the zigzag course of the path, which is one hundred and twenty yards in length.

Before entering the cave, let us rest ourselves on the benches before the door, that we may become perfectly cool, while the guide unlocks the door, strikes a light, and tells the story of its first discovery.

It seems that about the year 1804, one Bernard Weyer ranged these hills as a hunter; while pursuing his daily vocation he found his match in a lawless ground hog, which not only eluded all his efforts, but eventually succeeded in carrying off the traps which had been set for his capture. Enraged at the loss of his traps, he made an assault upon the domicil of the depredator with spade and mattock.

A few moments' labor brought him to the antechamber of this stupendous cavern, where he found his traps safely deposited.

The entrance originally was small and difficult of access; but the enterprise of the proprietor has obviated these inconveniences: it is now enclosed by a wooden wall, having a door in its centre, which admits you to the antechamber.

At first it is about ten feet in height, but after proceeding a few yards in a southwest direction, it becomes contracted to the space of four feet square. At the distance of twenty-four feet from the entrance, descending at an angle of nineteen degrees, you reach the Dragon's Room, so called from a stalactitic concretion, which the nomenclature undoubtedly supposed to resemble that nondescript animal.

Above the Dragon's Room there is an opening of considerable beauty, but of small size, called the Devil's Gallery. Leaving this room, which is not very interesting, you proceed in a more southerly direction to the entrance of Solomon's Temple, through a high but narrow passage, sixty-six feet in length, which is by no means difficult of access. Here you make a perpendicular descent of thirteen feet, by means of substantial stairs, securely fixed, and you find yourself in one of the finest rooms in the whole cave. It is irregular in shape, being thirty feet long, and forty-five broad, running nearly at right angles to the main course of the cave. As you raise your eyes, after descending the steps before mentioned, they rest upon an elevated seat, surrounded by sparry incrustations, which sparkle beautifully in the light of your candles.

This is not unaptly styled Solomon's Throne. Every thing in this room receives it name from the wise man: immediately to the left of the steps, as you descend, you will find his meat-house; and at the eastern extremity of the room is a beautiful pillar of white stalactite, somewhat defaced by the smoke of candles, called by his name, yet, with strange inconsistency, an incrustation resembling falling water, at the right of the steps, has obtained the name of the Falls of Niagara.

Passing Solomon's Pillar, you enter another room, more irregular than the first, but still more beautiful; it would be impossible adequately to describe the magnificence of the roof. I shall, therefore, merely observe, that it is thickly studded with beautiful stalactites, resembling in form and color the roots of radishes, which have given the appellation of Radish Room to this delightful place.

I cannot refrain here from reprobating the Vandal spirit of some visiters, who, regardless of all prohibitions, will persist in breaking off and defacing these splendid specimens of nature's workmanship, forgetting that a single blow may destroy the work of centuries.

The main passage to the rest of the cavern is immediately opposite to the entrance to Solomon's Temple, and you reach it by an ascent of twelve feet, to what is called the Porter's Lodge. From this place, pursuing the same course, you pass along a passage varying from ten to thirty feet in height, from ten to fifteen in breadth, and fifty in length, until you reach Barney's Hall, which receives its name from the fancied resemblance of a prostrate stalactite at the base of one that is upright, to old Commodore Barney, and the cannon that he used at the

Bladensburgh races. Near the centre of the room, which is small, and scarcely deserves the name, an upright board points out to the visiter the main path of the cave, which runs to the right. Two passages run off to the left; the first one to a large irregular room, called the Lawyer's Office, in which is a fine spring of water, or rather a reservoir where the droppings from the ceiling have collected; the other, through a passage to what is called the Armory, from an incrustation that has received the name of Ajax's Shield.

Between the Lawyer's Office and the Armory, and communicating with both, is another large, irregular apartment, which is named Weyer's Hall, after the original discoverer of the cave, who, together with his dog, stands immortalized in one corner. Before we get bewildered and lost in this part of the cave, which is more intricate than any other, let us return to the guide-board in the centre of Barney's Hall, and pursue the route usually taken by visiters.

Following the right hand opening, mentioned above, which is rather low, being not more than five feet in height, you pass into the Twin Room, taking heed lest you fall into the Devil's Rake Oven, which yawns close by your feet. This room is small, and communicates directly with the Bannister Room, which is fifty-nine feet distant from the guide-board. The arch here suddenly expands, and becomes elevated to the height of thirty feet, and by dint of hard climbing you may return to the Porter's Lodge through a passage directly over the one which you have just passed. Although there are many beauties in this upper passage, I would advise no one who is not an enthusiastic admirer of nature's works to attempt it.

A descent of thirty-nine feet from the Twin Room, in a direction due west, brings you into the Tan Yard, which contains many beauties. The floor is irregular, in some places sinking into holes somewhat resembling tan-vats, which, together with several hanging stalactites resembling hides, have given a name to this immense apartment. On the southeast side of the room, immediately to the left of the main path, is a large opening, which admits you at once into the armory already mentioned.

It may be well to remark here, that I have omitted, and shall omit to mention, many beautiful appearances in the different rooms, because they are noted upon the map of the cave, lately published by the author of this sketch.

Changing your course to the northwest, you leave the Tan Yard, by a rough but not difficult ascent of twenty feet, at an angle of eighteen degrees, into what may be considered as an elevated continuation of the same room, but which has been deservedly dignified with a distinct appellation. To your right, as you step upon level ground, you will observe a perpendicular wall of rock rising with great regularity; if you strike upon it with your hand it sends forth a deep, mellow sound, strongly resembling the tones of a basedrum, whence the room has received the name of the Drum Room. Upon a closer examination, this apparent wall will be found to be only a thin stalactitic partition, extending from the ceiling to the floor. There is nothing else of much interest in this apartment—we will proceed to the more magnificent portions of the cavern.

You leave the Drum Room by a flight of natural stairs, seven feet in perpendicular height. A large opening now presents itself, which expands to an extensive apartment, to reach which it is necessary to make a nearly perpendicular descent of ten feet, by means of a substantial pair of stairs. This apartment is the far-famed Ball Room. It is one hundred feet long, thirty-six wide, and about twenty-five high, running at right angles to the path by which you entered it. The general course of the room is from north to south, but at

the northern extremity there is a gradual ascent, bearing round to the east, and you reach a precipice of twenty or thirty feet, from which you can look down into the Ten Yard, having performed a complete circuit.

Near the centre of the Ball Room is a large calcareous deposite, that has received the name of Paganini's Stance, from the circumstance that it furnishes a good position for the music, whenever balls are given in these subterranean regions. The floor is sufficiently level to admit of dancing upon it, but it is not uncommon to have balls here. The ladies are accommodated with a very convenient Dressing Room, the only opening to which communicates directly with the Ball Room. You leave this room by a gradual ascent of twenty feet, at the southern extremity, similar to the one already described in the other.

This avenue is called the Frenchman's Hill, from the following circumstance. Some years since, a French gentleman visited this cave, accompanied only by the guide; they had safely gone through, and returning, had reached the top of this hill, when, by some accident, both of their lights were extinguished, and they were left in Egyptian darkness, without the means of relighting their candles. Fortunately, the guide, from his accurate knowledge of localities, was enabled to conduct him safely to the entrance, a distance of more than five hundred feet.

Another gentleman, by the name of Patterson, has immortalized his name by attempting the same feat, although it was a complete failure. Hearing of the Frenchman's adventure, he undertook to find his way back to the entrance from the Ball Room without a light; sending his company some distance ahead. He succeeded in ascending the stairs, but had proceeded only a few paces farther, when his foot slipped from under him, and he was prostrated into an aperture, where he lay unhurt, until his companions, alarmed at his protracted absence, returned for him. His resting-place is called Patterson's Grave to this day.

From the French Hill a long, irregular passage extends in a northwest direction, which is denominated the Narrow Passage. This passage is fifty-five feet in length, varying from three to five feet in width, and from four to eight feet in height. It leads you to the brink of a precipice, twelve feet in height.

Natural indentations in the face of this precipice afford a convenient means of descent; and these natural steps have received the name of Jacob's Ladder. In correspondence with this name, as in Solomon's Temple, everything is named after the patriarch; a flat rock opposite to the extremity of the Narrow Passage, is Jacob's Tea-table; and a deep, inaccessible perforation in the rock, by its side, is Jacob's Ice-house. Descending the ladder, you turn to the left, and pass through a narrow opening, still continuing to descend, though less perpendicularly, to the centre of a small apartment, called the Dungeon. The descent from the top of the ladder to this place is twenty-eight feet.

This room communicates by a passage of about four feet square, with the Senate Chamber. A thin flat rock stretches over nearly half of this apartment, which is only about forty feet in diameter, at the height of eight or ten feet from the floor, forming a sort of gallery, which doubtless caused the name already mentioned to be given to the room. The Senate Chamber communicates, by a high, broad opening, with a still larger apartment, denominated Congress Hall. This name must have been given on account of its proximity to the above-mentioned room, and not from anything particularly appropriate in the room itself. It is long, and, like the Ball-room, runs nearly at right angles to the main path, its course being nearly north and south; and a wall, having several openings, runs through its whole length. The main path winds to the left

as you enter the room; but we will diverge a little to the right, and explore the dark recess that presents itself to view.

The floor of Congress Hall is very uneven, and at the northern extremity rises somewhat abruptly. Climbing this ascent, if you pass through one of the openings in the wall mentioned above, you will be able to see through the whole extent of the other half of the room; but it is impossible to traverse it, on account of two or three deep pits that occupy the whole space between the wall and the side of the room. Turning around to the right of the opening through which you passed, your eye vainly endeavors to penetrate the deep, dark abyss that presents itself, and you hesitate to descend. Its name, the Infernal Regions, does not offer many inducements to enter it; and for many years it has been supposed to contain fixed air, so that visiters avoid it, and it has never until recently been thoroughly explored.

In the spring of 1833, accompanied by my brother, I determined at all hazards to explore this room, for I doubted the existence of any bad air, as I had never detected any in the course of extensive researches in almost every part of the cave. The guide accompanied us, and we each carried two candles, leaving a lighted one also at the end of Congress Hall. Thus prepared, we descended about twenty-nine feet before we reached a landing-place. Here our candles burned dimly, and great care was necessary to prevent them from going out entirely; indeed, four of them were out at one time, yet we experienced no difficulty of breathing, or any other indication of the presence of this much-dreaded gas. The floor was not level, but inclined at an angle of fifteen or twenty degrees, and when we emerged from the pit into which we had first entered, our candles again shone brightly, and displayed to our view a room more extensive than any I have yet described. Its greatest length was from east to west, and seemed to run nearly parallel to the path over which we have just travelled. From its great length, I was induced to believe that it approached very near to the Ball-room, and perhaps might communicate with it by some yet undiscovered passage. So strongly was I impressed with this idea, that I determined to ascertain, if practicable, how far I was correct. For this purpose, I set my watch exactly with my brother's, and requested him to go to the Ball-room, and to pursue, as far as possible, a low passage that leads to the right from the foot of the French Hill, while I went to the eastern extremity of this immense apartment. At an appointed moment, I fired a pistol, but the only answer was the deafening reverberations of the sound, rolling like thunder along the lofty arches. I shouted—but no return met my ear, save the hollow echo of my own voice, and I began to think that I had been hasty in my opinion At this moment, a beautiful stalactite sparkled in the light of my candle, and I forgot my desire to find some unknown passage, in my anxiety to secure this prize. Taking the butt of my pistol, I hammered gently upon it to disengage it from the rock where it hung. I was surprised to hear the taps distinctly answered, apparently from the centre of the solid rock. A repetition of the blows brought a repetition of the answer, and, by comparing notes, we were fully satisfied that there could be but little space between the two rooms.

We have lingered so long in these Infernal Regions that we must hasten back to the spot whence we diverged, in the centre of Congress Hall. Our course now lies to the south-west, up a perpendicular ascent of seventeen feet, to what is called the Lobby. From this place an expert climber, well acquainted with the cave, may pass through secret passages and by-rooms to the end of the cave, without once entering the main path; but we will pursue the accustomed route.

You have ascended to the Lobby, only to descend again on the other side;

after taking a few steps horizontally, a perpendicular descent of seventeen feet brings you to the most magnificent apartment in the whole cavern. This is Washington's Hall, so called in token of respect for the memory of our country's father, and it is worthy of bearing the name. Its length is two hundred and fifty-seven feet, its breadth from ten to twenty feet, and its height about thirty-three feet, being remarkably level and straight through the whole length.

Not far from the centre of this room, is an immense deposite of calcareous matter, rising to the height of six or seven feet, which very strikingly resembles a statue clothed in drapery. This is Washington's Statue, and few can look upon it, as seen by the dim light of two or three candles, which rather shadow than repress curiosity, without experiencing a sensation of awe and veneration, as if they were actually in the presence of the mighty dead. A few paces from the entrance, another room branches off to the left, to reach which you must ascend a bank of five or six feet in height. This is called the Theatre, from the fact that different parts of the room correspond to the gallery, stage, and pit. I notice this room, which is rather uninteresting otherwise, for the purpose of mentioning a circumstance related to me by Mr. Bryan, a former guide, which confirms an opinion that I have long entertained, that the whole cavern is thoroughly ventilated by some undiscovered communication with the upper air.

About nine years since, during a severe and protracted rain, which raised the waters of the South river that flows at the base of the cave-hill to an unprecedented height, Mr. Bryan conducted a company through the cave. As he ascended the stairs that lead from Congress Hall to the Lobby, he heard the roar of waters; supposing that the cave was flooding, he directed the visitors to remain in Congress Hall, while he examined more carefully into the cause of the unusual and alarming noise. Cautiously descending into Washington's Hall, he followed the sound until he arrived opposite to the entrance of the Theatre, to which he saw a column of water pouring down from the ceiling into deep, and losing itself in the numerous crevices that abound. When the rain ceased, the flood was stayed, and it has never been repeated; but even at the present time, small pebbles and gravel, resembling that found on the top of the hill, may be seen in the Theatre. No aperture is visible where the water could have come through so copiously, neither can any perforation be discovered on the surface of the hill; yet beyond a doubt some communication does exist. I have said that the breadth of Washington's Hall was from ten to twenty feet; this must be understood only of the lower part of the room, for the walls curve over a rock twenty feet high, which forms the left wall, and encloses another room called Lady Washington's Hall. The entrance to this apartment is opposite to the Statue, and is on the same level with the Hall. The wall that separates the two rooms is several feet thick, and has received the name of the Rock of Gibraltar. One or two candles placed upon this rock produce a fine effect, particularly if every other light is extinguished; for it shows you the arch, spreading out with beautiful regularity, until it is lost in the surrounding darkness, and imagination supplies the deficiency of vision, peopling the vast recesses with hosts of matterless phantoms.

You reluctantly leave this splendid apartment at the south-west extremity, by a long, narrow, but high passage, running at the foot of the Pyramids of Egypt and Cleopatra's Needle! At the end of this passage, in a recess at the right, is another spring or reservoir, not as large as the one in the Lawyer's Office. A descent of eight or ten feet brings you into the Diamond Room, which may be considered as forming a part of the Church, a long, irregular room, more

lofty than any that we have yet entered. Its length is one hundred and fifty-two feet, its breadth from ten to fifteen, and its height fifty!

At the farthest extremity, a beautiful white spire shoots up to a considerable height, which is appropriately styled the Steeple, and has, no doubt, suggested the name of the room. Nearly opposite to the centre of the Church is a recess, raised several feet, of considerable extent. This forms a very good gallery to the church. Immediately in the rear of the gallery, and in full view from below, is a great number of pendent stalactites, of several feet in length, and of various sizes, ranged like the pipes of an organ, and bearing a striking resemblance to them. If these stalactites are struck by any hard substance, they send forth sounds of various pitches, according to their size, and a stick run rapidly along several of them at once, produces a very pleasing variety of sounds. With great propriety this is called the Organ.

Passing under the Steeple, which rests on arch elevated not more than ten feet, you enter the Dining Room. This room is named from a long, natural table, that stands on the left side, and is not quite as large as the church, though its height is sixty feet. Were it not for the kind of wall which the steeple makes, it might be considered as a continuation of the church, and its length is therefore included in that of the church. A little to the left of the table you will observe a small, uninviting opening; if you are not deterred by the unpromising appearance of the opening, we will enter, and see whether it leads to anything worthy of notice. Proceeding only a few paces, you suddenly find yourself in an immense chamber, stretching from the gallery of the Church, with which it communicates, parallel to the Dining Room, to its utmost extremity, and proportionably wide. This is called Jackson's Room, and the floor is very irregular and uneven. This room is rather uninteresting, but it leads to one that deserves a passing notice.

Directly opposite the little passage which conducted you hither, is a large opening; passing this, the rocks contract, until only a narrow pass is left a few feet in length. This conducts you, if not to the most magnificent, at least to the most beautiful and interesting portion of the whole cavern. There is but one apartment, and that is small, but the Garden of Eden—for so it is called—derives its beauty from the singular arrangement of the immense stalactites hanging from the roof, and meeting the stalagmites, which have ascended from the floor to meet them; or, in few words, it seems as if, at some former period, a sheet of water had poured down from the roof, and, by some wonderful operation of nature, had become suddenly petrified. This sheet is not continuous, but strongly resembles the folds of heavy drapery, and you may pass among the windings as through the mazes of a labyrinth, and the light of a candle shines distinctly through any part of it. A portion of the floor of this room is composed of a beautiful fine yellow sand, whereas most of the cave is a stiff clay, with very few indications of sand.

We must now retrace our steps to the Dining Room, for there is no other place of egress; but let us first turn off to the left, as we return, into a small passage, that does not seem to lead very far. Be careful!—there is a deep hole just before you. Now look through this opening, which is large enough for a man comfortably to pass through, holding your candle above your head; you will see a deep, unexplored abyss,

"Where the footstep of mortal has never trod."

No man has ever yet ventured into this place, for it can only be entered by means of a rope-ladder; but if my life is spared, and my courage does not fail me, I shall, at no distant period, attempt to explore the hidden mysteries of the apartment.

Once more to the Dining Room, let us go on to the completion of our task. The main path pursues the same course from this room as it has done ever since you entered Washington's Hall; but your way now lies in a sort of hall, in the side of which is the opening through which you are to pass. If you are adventurous you will follow me above the opening, in the nearly perpendicular face of the rock, in the height of fifty feet, where a ledge of rocks stretches along, and forms the left side of the Dining Room. From this eminence, called the Giant's Causeway, you can look down into the Dining Room on one side, and Jackson's Room on the other. Great caution is necessary in climbing this height, lest too much confidence be reposed in the projecting stalagmites, that seemingly offer a secure foothold to the cautious adventurer, but frequently give way beneath him. It must be remembered that they are formed by droppings from the roof, and are often loosely in the mud. By cautiously descending the ledge for five or six feet on the side opposite to that which we ascended, we shall be enabled to mark with ease the room which has already been attained by the rest of the company, who have been less ambitious than ourselves, and passed through the little opening already pointed out in ascending the causeway.

This room, or perhaps it should be called passage, is denominated the Wilderness, from the roughness of the pathway, and is only ten feet wide, but it rises to the immense height of ninety or one hundred feet! As we come along the causeway, and look down upon our right, we shall see our company forty or fifty feet below us, while our eyes can scarcely penetrate through the darkness to the ceiling above their heads. Upon the very verge of the rock upon which we are standing are several beautiful white stalagmites, grouped together, among which one stands pre-eminent. This is Bonaparte with his body-guard, crossing the Alps. The effect is peculiarly fine when viewed from below.

Without descending from our dangerous elevation, we will go on our way a little farther. Proceeding only a few paces from the emperor, you find yourself upon an arch, under which your company are passing, which is very appropriately called the Natural Bridge; but it should be crossed, if at all, with great caution, for there is danger of being precipitated to the bottom. Retracing our steps nearly to Napoleon, we will descend on the left, and by a jump of six feet, rejoin our company at the end of the Wilderness.

You are now upon the lowest level of the cave, and at the entrance of the lowest room. This is Jefferson's Hall; an extensive, but not very elevated apartment, quite level. Before I describe this room, we must diverge a little, and visit one or two rooms that branch off from the main path. Directly to your right, as you emerge from the Wilderness, there rises an immense mass, apparently of solid stalagmite, thirty-six feet in length, thirty feet in breadth, and forty feet in height; this mass is beautiful beyond description, very much resembling successive stories, and is called the Tower of Babel! The most splendid portion of the tower is on the back, but it is difficult of access, for it is necessary to climb up the surface of the rock to the height of three or twenty feet; the view, however, amply repays you for the labor. For a few moments you can scarcely convince yourself that an immense body of water is not pouring over the precipice in a foaming cataract, so white, so dazzling is the effulgence of the rock; and when this impression is effaced, the words of the poets hard rush into the mind, where he describes the awful above that will follow the consummation of all things:—

"The cataract, that like a giant wrath
Dashed down in petrously, as seized at once
By sudden frost, with all his heavy locks,
Stood still!"

One might almost imagine that Pollok had visited this wonder, and caught the idea so forcibly expressed above, from viewing this magnificent scene.

We have already so much exceeded our intended limits, that we can only look into the large apartment that occupies the space behind the tower, which is called Sir Walter Scott's Room, and then hasten back to the main path.

Jefferson's Room, that we left some time since, is very irregular in shape, and is two hundred and thirty-five feet long, following the various windings. What is commonly called the end of the cave, is distinguished by two singular, thin, lamellar rocks, five or six feet in diameter, united at their bases, but spreading out so that the outer edges are several feet apart; this is called the Fly Trap. To the left of the Fly Trap is a large recess, where is a fine spring, at which the weary visiter is glad to slake his thirst, after the fatigues of his arduous undertaking.

Very many visiters have their curiosity satisfied long before they have gone over the ground that we have, but I am writing only for those who, like me, are not satisfied, until every thing is seen that is worthy of notice. Such would not excuse me did I not mention one more curiosity, which few take the trouble to visit. A few yards beyond the Fly Trap, there is an opening in the solid wall at the height of about twelve feet, through which you are admitted by a temporary ladder. By hard climbing you soon penetrate to the end of the recess, where you will find the Source of the Nile! This is a beautiful limpid spring, covered with a thin pellicle of stalagmite, yet sufficiently strong to bear your weight; in this crust there is a perforation that gives you access to the water beneath.

As far as it is practicable, I have described very cursorily this wonderful cavern; but I feel convinced that no pen can adequately describe a curiosity so extensive, so magnificent, and so varied in its beauties.

THE GROTTO OF ANTIPAROS.

[See page 87.]

Antiparos is a small island in the Archipelago, sixteen miles in circumference, and about one mile east of Paros. The Cyclades are clusters of islands situated on the north of Candia, and east of the celebrated city of Athens, among which are the islands of Scyros, where Achilles, Homer's hero, passed his infancy; Delos, celebrated for the birth of Diana and Apollo, for its palm-trees and festivals; and Naxos, noted for some of the events which happened to Ariadne, Theseus, and Bacchus.

The most remarkable natural object in these islands is the celebrated Grotto or Cavern of Antiparos, which is of great extent and beauty, and is supposed to have been known from a remote period of antiquity, for there are two inscriptions on natural pillars near the entrance, bearing the names of several individuals celebrated in Grecian history; and there exists a tradition among the inhabitants of the island, that Antipater and others, who conspired against Alexander the Great, took refuge in this cave for fear of being pursued, after their designs had been counteracted, which occurrence must have taken place about 2170 years ago. For nearly two thousand years all knowledge of the grotto was lost, as it was not till the seventeenth century that any person was known to enter it; whether this arose through terror arising from superstition, or was caused by ignorance of the existence of the cavern, is not exactly known; but whichever it was, an Italian traveller named Magni was the first person in

THE GROTTO OF ANTIPAROS

modern times who undertook the arduous task of exploring this dark and dismal spot, of which he gives the following account.

"Having been informed," says Magni, "that in the island of Antiparos a gigantic statue was to be seen at the mouth of a cavern, we (the French consul and himself) resolved to pay it a visit; accordingly we landed on the island, and walked about four miles over some beautiful plains and sloping woodlands, till we came to a little hill on the side of which yawned a hideous cavern, whose terrific gloom almost repressed our curiosity; after a moment's pause, however, we entered, and had not proceeded above twenty paces, when we perceived that the supposed statue of a giant was in reality nothing more than a sparry concretion formed by water dropping from the roof of the cave, and gradually hardening into a figure, which the fears of the country people had transformed into a monster (the calcareous depositions formed on the roofs of caverns are called in scientific language stalactites, whereas stalagmites are incrustations formed on the floors of caverns). Incited by this extraordinary appearance, we determined to penetrate farther in quest of new adventures; and, as we proceeded, new wonders presented themselves to our contemplation: the spars, formed into a variety of trees and shrubs, exhibited a kind of petrified grove,—some white, some green, and all receding in due perspective. Our amazement was much increased by considering that these objects were mere productions of nature, who had in her playful moments decorated the scene for her own amusement. But we had hitherto seen but a few of the wonders of the place, and were only introduced into the portico of this stupendous temple. In one corner of the half-illuminated recess we discovered an opening about three feet wide, which seemed to lead to a place totally dark, and which our guide assured us contained nothing more than a reservoir of water; upon this we threw down several stones, which rumbled along the descent for some time, and at length seemed to fall into a bed of water; but as we were anxious to gain more satisfactory intelligence, we prevailed on a Levantine mariner to light a flambeau and explore the narrow aperture. After continuing in it for about one quarter of an hour he returned, holding some beautiful pieces of white spar in his hand, and informing us that the place was full of similar incrustations. We now ventured to follow him for about fifty paces, cautiously descending by a steep and dangerous path; but on approaching a precipice which led into a sort of amphitheatre, we returned for a ladder, flambeau, and other things to expedite our descent. We then went down into the most magnificent part of the cavern, and having lighted a number of candles, were entertained with a most glittering and interesting scene. The roof was hung with beautiful icicles, transparent as glass, yet solid as marble; the sides were regularly formed with spars; the floor consisted of solid marble, and in several places were representations of magnificent columns, thrones, altars, and other objects, as if nature had designed to mock the richest works of art. Below this spacious grotto there appeared another cavern, into which I descended about fifty paces by means of a rope, and at length arrived at a small spot of level ground, where the bottom consisted of a soft clay, and easily yielded to my pressure; but here, as in the upper cave, was a variety of beautiful crystallizations, one of which particularly resembled a table. Upon our egress from this stupendous grotto, we perceived a Greek inscription upon a rock at the entrance, but the characters were so obliterated by time that it was utterly impossible to decipher them."

As this is the first modern account of the grotto, and does not contain full particulars of all its wonders, we shall introduce the following, which we consider one of the most graphic descriptions that can be given.

"We," says the author, for the party consisted of a surgeon, the writer, and four other persons, attended by six guides with lighted torches, "after two miles march from the coast, came to the entrance of the grotto, which is a large low arch, about thirty feet wide, formed of rough craggy rocks overhung with bramble and climbing plants, which give it an air of awful gloominess. After proceeding some twenty yards from its mouth, we lost all sight of daylight, but the roof and sides of the alley through which we were passing glittered like diamonds by the reflection of our torches.

"At the end of this passage we were presented with ropes to tie about our waists, which when we had done, our guides led us to the brink of a most terrible precipice. The dreadful depth of this, and the horror of the descent through a miserable darkness, made me look back to the lane of diamonds we had just left; but the hope of seeing something curious at the end of my journey, compted me to lower myself down by the rope as the guides directed. After reaching the bottom and congratulating my friends on our safe descent, I inquired for the grotto; but our guides told us we had a great way to go yet; and they immediately led us forward under a ridge of rugged rocks to the brink of another precipice, much deeper and more terrible than the former. Two of the guides now preceded us with torches, and by their light we could discern that this passage was not so perpendicular as the other, but lay in a steep slant with a very slippery rock for the bottom; vast pieces of rock jutting out on one side in the descent, and forcing the guides sometimes to creep under, sometimes to climb over, and at other times to go quite round them; while a series of dark caverns, like so many monstrous wells, yawned on the opposite side, ready, if a man should slip, to swallow him up for ever.

"We stood sometimes on the edge to watch the motions of our guides; and were equally amazed and terrified to see them descend before us till they seemed at a most frightful depth. On their calling to us from the bottom, we began to descend after them; but we had not gone 30 feet down when we came to a place where the rock was perfectly perpendicular, and a vast cavern seemed ready to swallow us on one side, while a wall of rugged rock threatened to break us on the other. At this terrible prospect I was quite disheartened, and declared I would proceed no further; but as the guides assured us there was no danger, and my companions resolved to see the bottom, I proceeded to a corner where was placed an old ladder, and by this we all descended.

"Having surmounted this difficulty, we found ourselves at the entrance of another passage, which, as we slid down, appeared to be about 9 feet high and 7 feet wide, and to have for its bottom a green glossy marble. The walls and arched roof being as smooth as if wrought by art, and composed of a glittering red and white granite, supported with red porphyry, made a most splendid appearance. When we entered this passage I expected that we should at the bottom be joined by the two guides we had first sent down; but alas! when we got there, we found ourselves at the mouth of another precipice, which we descended by a second ladder not much better than the former. The dread of falling employed all my thoughts during this descent; but I observed, as my companions were coming down after me, that the wall to which the ladder was fastened was a solid of red marble, covered with white sprigs of rock-crystal, and looking with the glow of the purple from behind one immense sheet of amethyst.

"After sliding about 20 feet through another shallow vault of green and white marble, and refreshing ourselves with a little rum, we proceeded through a sloping passage of rough coarse stone, full of figures of snakes, rolled round, and seemingly alive, but in reality as cold and as hard as the rest of the stone.

When we had walked about 200 yards down this descent, we saw two beautiful pillars of a glittering yellow marble, which seemed formed to support the roof; and soon afterwards we descended another precipice, which the guides assured us was the last.

"At the bottom of this precipice we found ourselves for some way upon plain even ground; but after walking about 40 yards we entered an alley, the sides and roof of which were entirely composed of black stone, and the rocks were in some places so steep and rugged, that we were forced to slide down on our backs, and were bruised miserably in passing. Over our heads were nothing but dismal rocks, some of which threatened to fall in upon us, and the light of our guides' torches only served to show the surface of some dirty lakes of waters.

"If I had repented of my expedition before, I now gave myself over for lost, bitterly accusing all the travellers who had given such a description of the place as excited people's curiosity, without warning them of the horrors that lay in the way. In the midst of these sad reflections we lost four of our guides, and as the place was now much darker for want of their torches, I expected to follow them into some of those lakes where I supposed they had inevitably perished, although the two remaining guides assured us that we should soon meet their companions again, and that we were very near the end of our journey.

"Our passage was now become extremely narrow, and we were obliged to crawl on our hands and knees over the rugged rocks, when in an instant I heard a hissing noise, and found myself in total darkness. The guides told us they had accidentally dropped their torches in a puddle of water; but exhorted us to crawl forward, and told us there was no danger. I was, indeed, astonished at the courage of these men, in a place where I thought four of them had already perished; but as I thought it impossible for any of us to escape from our situation, I determined to lie down and die where I was. One of the guides, however, immediately came up to me, and clapping his hand firmly over my eyes, dragged me a few paces forward. While I was in this strange situation, expecting death in a thousand shapes, and trembling at the rough behavior of my conductor, he suddenly lifted me over a great stone, set me on my feet, and removed his hand from my eyes. But what language can express my transport and astonishment at that moment, when, instead of darkness and despair, all was splendor and magnificence before me; my friends all appeared about me; the place was illuminated by fifty torches; and all the guides welcomed me to the Grotto of Antiparos. I now found that the four men whom I had deemed lost, had given us the slip in order to get the torches lighted before we came; and the other two had wilfully put out their lights that we might enter out of utter darkness into this pavilion of splendor and glory.

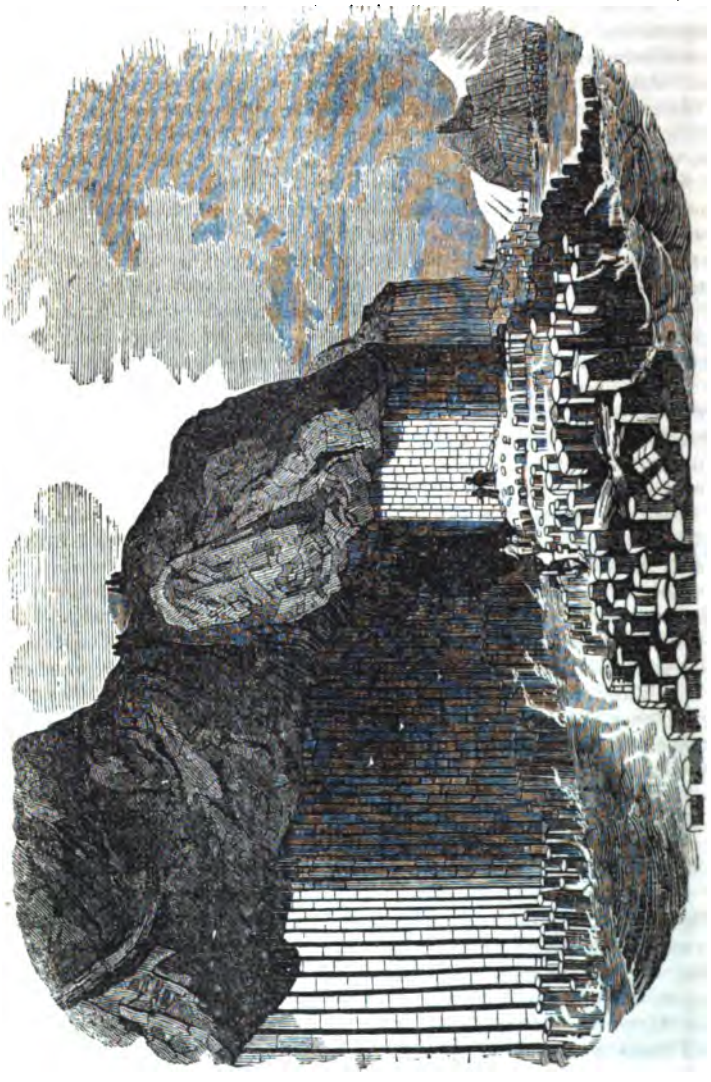
"The grotto in which we now were is 120 yards wide, 113 long, and about 16 yards high. These dimensions are somewhat different from those which travellers have generally presented to the public; but they are certainly accurate, for I took them with my own hand. Imagine then an immense arch like this, lined with crystallized white marble, and illumined by fifty torches, and you will have some idea of the place in which I spent three hours. The roof, which is a fine vaulted arch, is hung all over with icicles of white marble, some of them ten feet long and as thick as a man's waist; and from these depended a thousand festoons of leaves and flowers of the same substance, but so extremely glittering that it is impossible to look upon them without dazzling one's eyes. The sides of the arch seem planted with trees of white marble, rising in rows one above the other; from these are hung beautiful festoons, tied as it were from

ous to reckon in prodigious quantities, and in some places there actually seem to be rivers of marble winding in a thousand elegant meanders. All these things have been made in a long course of years by the dropping of water, but they really look like trees and brooks transformed into marble. The floor was rough and uneven, with red, blue, green, and yellow crystals growing out of it in an, irregular manner; these were all shaped like pieces of saltpetre, but so hard that they cut our shoes. And among them are placed icicles or small pillars of white shining marble, to each of which our guides fastened two or three torches. All around the sides of the arch are white masses of marble in the shape of oak trees, and sufficiently large in many places to enclose a piece of ground big enough for a bed-chamber. One of these chambers has a beautiful curtain, whiter than satin, of the same marble, stretching entirely over the front, on which we all cut our names and the date of our visit, as many other persons had done before us. There is scarcely a column in the whole grotto but what has been injured by the indiscreet curiosity of travellers, either for the purpose of examining their internal organisation, or of enriching their own cabinets with small fragments of the pillars. But new ones would continually be completed, were the portions which are constantly being formed, and which have a direction approaching toward each other, left untouched. In the middle of the great hall, as it is designated, there is an immense stalagmite, more than twenty feet in diameter, and about twenty-four feet in height. This large column has a very striking resemblance to an altar, and the beautiful pillars that shoot up round this altar have the appearance of large candlesticks, besides which there are many other natural objects that look like the customary ornaments of a church, so that the whole has a very great similitude to the interior of a religious edifice. Indeed, the Marquis de Nointel, who went as ambassador from Louis XIV. of France to the Ottoman Porte in the year 1673, had high mass celebrated in the grotto for the three days of the Christmas festival. About 400 persons attended this interesting and pious ceremony. Men were posted from the extremity to the entrance to communicate the moment when the host was elevated to those without, who discharged their fire-arms, and sounded trumpets and other musical instruments, to render the consecration more impressive. The echoes in speaking and singing were increased to a most astonishing loudness through the vaulted roofs, and the firing of guns was reverberated in such a terrific and awful manner, that it was almost deafening. During the three days and nights, the grotto was illuminated by 100 large torches of yellow wax and 400 lamps which were kept constantly burning. This event the marquis caused to be recorded in an inscription cut on the base of the altar.

HIC IPSE CHRISTUS ADFUIT
EIUS NATALI DIE, MEDIA, NOCTE CE
LEBRATO, M.DC.LXXIII.

"Whether the whole extent of the cavern has been explored is very doubtful, but the whole length from the entrance which has been visited is about 1200 feet. The inhabitants of the island affirm that it reaches below the sea, and that a goat, having accidentally wandered into it, was found in the isle of Nio, between thirty and forty miles distant; but though this is most probably incorrect, yet there is no doubt that many recesses still remain unentered, and he who does enter further must be a bold traveller indeed, since the cave has such terrific horrors about it."

The breadth of the great hall is 300 feet, and the floor at the lowest part is about 254 feet below the surface of the earth.



FINGAL'S CAVE.

FINGAL'S CAVE.

[See page 92.]

FINGAL'S CAVE, in the isle of Staffa, one of the Hebrides, or Hebudes, on the western shores of Scotland, has always been an object of attraction to the tourist and the lover of nature. The little island of Staffa lies on the west coast of Mull, about nine miles north-east from Iona, or Columb-Kill. The name Staffa is Norwegian, and is very properly bestowed on this picturesque spot on account of its singular construction: it implies a staff, prop, or figuratively, a column. Its circumference is estimated at about two miles. It forms a sort of table-land of an irregular surface, bounded on all sides by perpendicular cliffs, varying in altitude, and broken into numerous recesses and promontories. It is intersected by one deep division, scarcely to be termed a valley, which divides the higher and more columnar part from the remainder of the island. At the highest tides, this more remarkably columnar portion, which forms its south-western side, appears to terminate almost abruptly in the water; but the retiring tide shows a causeway of broken columns, forming a sort of beach at its foot. Round the other sides of the island there is also a beach of varying breadth, consisting of detached fragments, and of rocks jutting out into the sea, in many irregular directions. This beach, when the weather is perfectly calm and the swell off the shore, under due precautions will afford landing in various spots; but it is on the eastern side that the most numerous landing places occur. Various narrow creeks, sheltered by the island itself from the predominant west swell, admit of easy access in moderate weather, provided the wind is in a favorable direction; but the love of the marvellous has conferred on Staffa a terrific reputation, which a greater resort has discovered to be somewhat allied to that of Scylla and Charybdis.

The highest of the perpendicular faces which bound it, rise about sixty or seventy feet above the high-water mark, and these are on the south-western side; the greatest elevation of the island is about one hundred and twenty feet above the level of the sea. There are no sunken rocks around it, but the water deepens rapidly from the shore. There is a soil of considerable depth on the surface, which is covered with herbage. The whole of the south-west portion of the island is supported by ranges of natural pillars, mostly about fifty feet high, standing in beautifully formed colonnades, according as the points of land form themselves upon a firm basis of solid unformed rock; above these, the stratum which reaches to the soil or surface of the island varies in thickness, as the island itself is formed into hills or valleys. Each hill which hangs over the columns below forms an ample pediment; some of these are about sixty feet in thickness from the base to the point, formed by the sloping of the hill on each side, almost into the shape of those used in architecture.

Proceeding along the shore, studded with these grand and striking characteristics, the Cave of Fingal in all its grandeur appears. The mind can scarcely form an idea more magnificent than such a space, supported on each side by ranges of columns, and roofed by the bottoms of those which have been broken off. In different places a yellow stalagmitic matter has exuded, which varies the color with a great deal of elegance, and to render it still more agreeable, the light is reflected from without, so that the farthest extremity is very plainly seen, and the air within being agitated by the flux and reflux of the tides, is perfectly dry and wholesome, and free entirely from damp vapors.

The pillars are generally erect, and although not tall, of large diameters; at their feet is an irregular pavement made by the upper sides of such as have

been broken off, which extends as far under water as the eye can see. Here the forms of the pillars are apparent; they vary perpetually in the number of their angles, the pentagon and hexagon being the most common, and those of an inferior number of angles being less common than those of a superior. Their joints are very irregularly placed, and are frequently deficient through a considerable length. When separated, the touching surfaces are either flat, or marked by a slight respective concavity and convexity. The diameters of the largest pillars have been found to measure five, and the heights of many of them seven feet. Their surfaces are rough and uneven, full of cracks in all directions, yet their perpendicular figure is easily traced; hence, whatever might have caused their dislocation, it happened after the formation of the pillars. The pillars, and indeed the whole island, consist of a mass of basalt: a sandstone bed has been seen at low water on the south-western side, and most of the *trap* rocks of the Western islands are founded on beds of this formation. The term *trap* is one given to a class of rocks having a resemblance to one another in mineralogical characters, from the Swedish word *trappa*, a stair, because of the stair-like appearance they present. The texture of the pillars is more compact, more crystalline, and less earthy than that of basalt in general, and it is at the same time less homogeneous, less black, more fragile and sonorous. The stratum above the pillars is found to be uniformly the same, consisting of numberless small pillars bending and inclining in all directions, sometimes so irregularly that the stones can only be said to have an inclination to assume a columnar form; in others more regular, but never breaking into or disturbing the stratum of large pillars, whose tops keep everywhere a uniform and regular line.

The length of the Cave, calculated from the rock without, is estimated at three hundred and seventy feet, but from the pitch of the arch two hundred and fifty. At the mouth of the arch it is about fifty feet broad, which in the interior becomes narrower; its height at the entrance is nearly one hundred and twenty feet; at the end it decreases to seventy. These grand natural colonnades, and the broken pillars of the roof, present the appearance of the enrichments of Gothic architecture. Compared to this, a writer of great talent exclaims, What are the cathedrals or the palaces built by man?—mere models or playthings, imitations as diminutive as his works will always be when compared to those of Nature. Where is now the boast of the architect?—regularity, the only part in which he fancied himself to exceed his mistress, Nature, is here found enthroned in full possession. Is not this the school where the arts were originally studied, and what has been added to this by the whole Grecian school?—a capital to ornament the column of Nature, of which they could execute only a model; and for that very capital they were obliged to a bush of Acanthus. How amply does Nature repay those who study her wonderful works! The Cave runs into the rock in the direction of north-east by east, by the compass.

Proceeding along the shore in a north-westerly direction, the highest pillars are met with. Their surface is rough, with large lumps of stone adhering to them, and their general appearance would seem to indicate remains of lava, and the more so as many of the lumps appear to be of the very same stone of which the pillars are formed; this whole stratum lies in an inclined position, gradually verging toward the south-east. There are many caves in various parts of the cliff around the island, into which the deep sullen billows of the Atlantic roll with a noise resembling heavy and distant ordnance. One on the western side has its pillars curved; instead of being upright, they lie down on their sides, each forming a segment of a circle, and resembling somewhat the ribs of a vessel. Off this cavern, which is termed Clamshell Cave, is situated a very extraordinary aggregation of columns forming a conical detached rock, called,

in the Erse language, *Bun-sha-la*, or more properly *Buachaille*, or the Herdsman, a term that is applied to conspicuous single rocks all over the country. It is separated from the main land by a channel not many fathoms wide; is composed of pillars without any stratum above them; these are small but more compactly formed than any, consisting of variously inclined columns resting against each other, and meeting till they form a conical body, which appears to repose on a bed of curved and horizontal columns.

The first division of this island—for at high water it is separated into two—makes a kind of cone, the pillars converging together toward the centre; on the other, they are in general laid down flat. In the portion next to the sea, they are beautifully packed together, their ends coming out square with the back which they form; all these have their transverse sections exact and their surfaces smooth, which is by no means the case with the large ones, which are cracked in all directions. The columns in Buachaille do not exceed two feet in diameter. On the northern shore of the island is *Our-na-scarve*, or the Cormorant's Cave. Here the stratum under the pillars is lifted up very high; the pillars above it are considerably less than those at the north-west side of the island, but still very considerable. Beyond is a bay, which cuts deep into the island, rendering it in that place not more than a quarter of a mile over. On the sides of this bay, majestically beyond a little valley which almost divides the island, are two stages of pillars, but small, however, having a stratum between them, exactly the same as that above them, formed of innumerable little pillars, sticken out of their places and leaning in all directions.

According to Dr. Macculloch, whose authority on this subject stands high, the basalt exhibits two modifications, the columnar and the amorphous (implying without regular form), which is generally more or less amygdaloidal (containing simple minerals), and having imbedded zeolites or minerals of different sorts. He says, he saw no examples of basaltic breccia or trap-tuff, as it is sometimes termed.

The magnificence of the grand Cave of Fingal is greatly heightened by the twilight gloom that is spread around; long, heavy, and sullen billows roll in from the vast Atlantic, and at sunset, when the sea glows with the glare of departing day, the sun sinking beyond the expanse, illuminating the thin vapors and tinging the clouds—the lofty rocks of St. Kilda appearing on the verge of the horizon, and the sombre and silent wilderness of isles and rocks around. The mountains of the main land and some of the islands are seen like black clouds upon the horizon; beneath and around, the dark, unfathomed, unexplored ocean. "In such a place, at such an hour," the man who is at all given to reflection must feel some sense of awe; and he whose mind has been imbued with the spirit of devotion must feel peculiarly impressed with the sensible presence of that power, and awful, and pervading principle,—that magnificent Being whom we all see in the thunder-storm, in the whirlwind, in the earthquake, in the volcano, in the great solitudes, whether of the ocean or of the land, however we may find our eyes to his presence in the hour of sunshine and calm, in the lively and cheerful scenes of nature, or the giddy and intoxicating ones of society.

A similar feeling associates itself with our views. The desolate nature of the surrounding scenery, where the gray and lichen-crested rocks are only here and there covered with heath and coarse grass; the murmur of the restless waves as they dash upon the shores, swelling at irregular intervals upon the breeze, the wide ocean, on which a ship is scarcely seen; the rugged cliffs and barren isles encircled with white foam, and the scream of the wandering seabird, or the plaintive note of the plover, are all conducive to the inspiration of melancholy in a mind not of the most callous and unimpressible order.

Dr. Maculloch observes: "But if this Cave were even destitute of that order, symmetry, and richness, arising from the multiplicity of parts, combined with greatness of dimensions and simplicity of style which it possesses; still the prolonged length, the twilight gloom half concealing the playful and varying effects of reflected lights, the echo of the measured surge as it rises and falls, the transparent green of the water, and the profound and fairy solitude of the whole scene, could not fail strongly to impress a mind gifted with any sense of beauty in art or nature. If to these be added that peculiar sentiment with which, perhaps, Nature most impresses us, when she allows us to draw comparisons between her works and those of Art, we shall be compelled to own it is not without cause that celebrity has been conferred on the Cave of Fingal."

—

BASALTIC FORMATIONS.

BASALT is a term employed by geologists to describe a rocky compound, which forms the most beautiful columnar masses to be found in the structure of our globe. In many places these natural architectural edifices are to be found, exceeding in magnitude and grandeur of arrangement the boasted colossü of Egyptian or Indian art. Basaltic formations have a singular tendency to assume a columnar shape, and while this fact is allowed to be a characteristic of this mineral, no constituent solid material of the globe has been more frequently the subject of dispute among recent geologists—an almost equal number strongly contending for its igneous and its aqueous origin.

Basaltic columns of greater or lesser magnitude are found in nearly every part of the world, but the most remarkable groups are to be seen among the British islands. As it is not our design to notice in detail these formations, but simply to make a geological inquiry concerning this species of mineral, we will take but a brief view of two or three of the most remarkable of these groups, as illustrative of the whole.

The Giant's Causeway, in Ireland, consists of three piers projecting from the base of a stratified cliff about four hundred feet in height; the principal

per is visible for about three hundred yards in extent, at low water; the others no more than half that distance. It is composed of polygonal or many-sided pillars, of dark-colored basalt, (see the above engraving,) so closely united that it is difficult to insert more than a knife-blade between them; and the formation of a continuous surface at each point in the pavement, by polygons, whose angles vary considerably. Toward the centre of the whole mass the pillars extend; and, from the peculiar appearance of the surface, this vertex is usually called the Honeycomb. The number of the sides of these pillars varies from three to nine.

Each pillar is a distinct piece of workmanship, separate from the other columns, and then of itself separable into distinct joints, whose articulation is as perfect as human ingenuity could have made it, the terminations being concave and convex. Stability to this piece of architecture is given by the angles of the lower joints overlapping the upper ones so closely, that to dislocate them a fracture is frequently produced.

In the vicinity of the Causeway, the whole coast of Antrim presents a succession of basaltic capes and sudden elevations, which give to the mind of the imaginative visiter the appearance of hundreds of splendid palaces, half submerged by the waters of the ocean. The most remarkable of these promontories is the one represented in the subjoined engraving. The detached mass in the centre is called Carrick-a-Rede.

Carrick-a-Rede.

This island is of nearly the same height as the adjacent main land, and formed entirely of basaltic columns. This mass is separated from the main land by a chasm of sixty feet in breadth. Large iron rings are fastened into the rocks on each side, to which two ropes are fastened, having cross ropes at intervals sufficiently frequent to support a row of planks. This forms a bridge over which people safely pass.

GREAT CAVERN IN SCHOHARIE CO. NEW YORK.

The following description of this cavern we quote from a New Brunswick paper. — About twelve miles west of the Knox Cavern, the village of Schoharie is situated, in the midst of a delightful valley, surrounded by mountains from four to six hundred feet in height. These mountains are composed prin-

cipally of secondary limestone, in which are hundreds of caverns. Many of these are interesting from the circumstance of their being natural ice-houses, so cold as to contain ice all the year; others on account of their vast size; and others because they contain some of the most curious specimens that nature forms in these dark and deep recesses.

During a few years past I have explored many of these caverns, but as I should weary you were I to describe all I have seen, I will only give you a sketch of the Great Cavern, the most interesting one, by far, in this part of the United States.

This cavern is situated about three miles northeast of Schoharie Court House, and was first explored in 1831. The first opening is a gradual depression in the earth, about twelve feet in depth, which reaches to a perpendicular passage in the limestone, about ten feet in length, six in breadth, and seventy-five in depth. This opening was at first descended by a rope, but it is now by a ladder, which, in its present condition, is by far the more dangerous of the two. At this depth is a narrow fissure in the rock, from which the mineral, prickly arragonite, has been procured. From the base of the ladder commences a passage from four to ten feet in width, and fifty-five in length, running in a southerly direction, at an angle of at least sixty degrees with the horizon. The walls of this passage, when first discovered, were covered with some of the most beautiful arragonite ever found in this country; but they were soon stripped of this interesting mineral, and the cavern, it was supposed, contained no more.

During my last visit I saw a quantity of clay adhering to the rock at the height of about forty feet, and it seemed possible that a deposite of arragonite might be concealed under it. With considerable difficulty I succeeded in reaching this spot by means of a ladder, placed upon a projecting rock, and extending across the passage. After removing the clay, I had the pleasure of finding what I had anticipated, and in the course of a few hours obtained about a bushel of this elegant mineral. But I might have paid dearly for my treasure, for the least slip or unsteadiness would have sent me headlong down a gulf of one hundred feet in depth, upon a floor of pointed rocks.

At the end of this inclined passage is a second perpendicular descent of fifteen feet, and from this to the bottom of the cavern is another descent of thirty feet, and of about the same inclination as the third passage. Here the opening is about ten feet wide, but the perpendicular walls reach about one hundred feet in height. On the north is an aperture sufficiently high to admit a person lying flat upon the rocky bottom, Here is seen a *lake*, as smooth as a mirror, and clear as crystal, on whose bosom lies a boat just large enough to contain a single person. Whoever has the boldness to navigate this gloomy region, unaided and alone, places lights on the bow and stern of the boat, falls upon his knees, inclines his head to protect it from the low rough rocks, and pushes himself forward. At the distance of a few feet the roof is so high that he can assume an erect position. The passage varies in width from five to thirty feet, and the water from two to thirty feet in depth. A few hundred feet from the entrance he meets with a semicircular dam formed of calcareous tufa. This is a brown spongy mass of lime, sand, &c., deposited by water. Over this dam the water falls twelve or fifteen inches, and the navigator is obliged to stand on this frail barrier and draw the boat into the water above. But he soon meets with thirteen similar dams formed in the same manner, from fifteen to twenty feet apart, and from two to fourteen inches above the water. The light reflected from these little waterfalls, presents a view of almost unrivalled beauty. Having passed these obstructions, he soon reaches the termination of the water,

red ascending a small rocky hill, he enters, through a narrow opening, the Square Room, which is about fifty feet square, and sixty feet high. Upon the floor lie scattered masses of rock, which appear to have just fallen from the roof, and huge shapeless blocks hang upon the poise and seem to threaten the intruder with instant death. At this spot he hears the mournful sound of an unseen waterfall, resounding through the chasms of the rocks, which he easily imagines to be his funeral knell. There are in this wing of the cavern no peculiar formations, except the dams, in consequence of the abundance of sandstone mingled with the limestone.

From the perpendicular passage the subterranean traveller creeps a distance of twenty feet, when he arrives at a narrow opening to the left, leading into a room about twenty feet in diameter, and about thirty feet high. Returning by the aperture, he proceeds thirty feet farther, when he reaches a second lake extending across the cavern. This lake is about ten feet below the level of the first (to which it is connected by a small brook that runs on the west side of the low opening,) and is in many places about thirty feet deep, consequently it can be crossed only by a boat. Into this he now enters, and after sailing three hundred feet over water so transparent that the smallest pebble can be seen by torch-light at the bottom, he reaches the spot where the water disappears beneath the rocks. After climbing up the steep acclivity to the right, he stands in the Rotunda, the noblest room in the cavern. It is of a regular and circular form, one hundred feet in diameter, and nearly one hundred feet in height. The floor descends gradually to the centre, forming a spacious gallery all around it. When first discovered this room was very rich in mineralogical specimens, but they were long since removed to the cabinets of the curious.

To the right of the Rotunda were at first several rooms, but they last winter were united by the clay being dug away which separated them. In this clay have been found vast numbers of beautiful white stalagmites and stalactites, and vast slabs of alabaster, in and on which were found stalagmites weighing four or six hundred pounds each. Some of the most curious specimens that have been found here, are in Peale's Museum in New York, the most singular of which is a stalagmite exactly resembling the human mammary or suckling organ.

As you are acquainted with the manner in which these specimens are formed, you may be surprised to learn that they have been found from two to three feet below the surface of the clay; I will therefore explain how they came in so singular a situation. After a quantity of stalactites and stalagmites were formed, by some means the cavern became filled with water, in which was a vast quantity of clay in particles. The stalactites that had fallen off by their own weight, and those that were broken off by the rush of the water, together with the specimens formed on the floor, were buried by the clay as it fell down from the water. The cavern at length became drained by the water finding a passage, probably where we now see it, and formations again commenced. It is certain that there was a long period before the cave was filled with water, because the specimens required many hundred years to attain their size, and they could not have been formed while the water was in it, and it is equally plain that hundreds of years have passed away since the draining of the cavern, for stalagmites in the clay were found as large as those in it.

To the south of the Rotunda a long narrow passage extends four hundred and fifty feet, but it remains nothing of interest. The whole distance that has been explored is three thousand feet, or about three fifths of a mile; but as there is a vast body of clay in the southwestern part of the cavern, no idea can be formed of its real extent. Its depth from the surface to the bottom of the water is one hundred and eighty feet."

STUPENDOUS CAVERN AT WATERTOWN, NEW-YORK.

Passing through the beautiful village of Watertown a few days since, curiosity induced me to visit this wonderful phenomenon, first discovered in 1820, I believe—and an imperfect description of it may not be uninteresting to your readers.

The ground in which it is located is gently rising, so as to embrace a perfect view of the whole town, which surrounds it in a crescent form, and is beautifully adorned with trees, and forms an elegant park or lawn. It has long been neglected, owing to a destructive fire which destroyed the factory belonging to the Jefferson Cotton-mills Company, some years since, and has recently passed into the hands of enterprising individuals, who are about to adorn it with mansions of an elegant structure. The scenery all around is untiring and picturesque, with falls of water next in beauty to Trenton and Passaic. On a small island in the centre of the Black Water River, are the ruins of the factory just alluded to. It was one of the largest in the United States. Its stone walls of gray and white, all standing, with its hollow windows and broken fissures, give note of the progress of decay. The view from one end to the other seems interminable, and appears like a monument of the history of ancient days. Its bare walls are unsupported but at their base, and their towering heights are inaccessible, crumbling, and imminent. They stand as a moral emblem of the resistance against every thing save the elements and time. The lightning's flash struck down part of the rear wall, which the fire could not overcome, and the rude tempest still howls through its sleeping clefts. Its history tells also the tale of wo and prosperity. Its owner was called out of church on a Sabbath morning to see his factory in flames: it ruined him, and he travelled to the far west, where, unexpectedly, he is now, by a reverse of fortune, accounted one of the wealthiest.

A moonlight visit to this scene is beyond my description. I sat down on a projecting cliff which overlooks the mighty falls and abyss below, buried in my own thoughts, and the drowning noise of the cataract, with its spray sparkling in the moonbeam, and its waters rushing round in wild and sportive play.

This extraordinary cavern, or grotto, is about ten rods from the river, and north of the falls and island. A guide, who resides on the premises, led the way, illuminated the halls below, and restrained us from entering too hastily, owing to its dampness. The great extent of the cavern, and the great number of spacious rooms, halls, and chambers, into which it is divided, the immense quantities of calcareous concretions which it contains, and the different states of these concretions, from the consistence of lime-water, to that of the most beautiful stalactites as hard as marble, render it difficult, if not impossible, to describe it, and I shall only attempt to give a faint description of three or four rooms.

The mouth of the cave is in a small hollow, about five feet below the surrounding surface of the earth; you then descend sixteen and a half feet into a room about sixteen by twenty feet, and eight feet high; and behold in front of you a large flat, or table-rock, twelve or fourteen feet square, two feet thick, and elevated about four feet from the bottom of the cavern; the roof overhead is covered with stalactites, some of which reach to the table-rock. On your left hand is an arched way of one hundred and fifty feet; and on your right hand is another arched way, six feet broad at the bottom, and six feet high, which leads into a large room. Passing by this arch about twenty feet, you arrive at another, which leads into a hall, ten feet wide and one

hundred feet long, from five to eight feet high. It is supported by pillars and arches, and its sides are bordered with curtains, plaited in variegated forms as white as snow. Near the middle of this hall is an arched way, through which you pass into a large room, which, like the hall, is bordered with curtains, and hung over with stalactites; returning into the hall, you pass through another arch, into a number of rooms on the left hand, curtained, and adorned with stalactites which hang from the roof. You then descend about ten feet into a chamber, about twenty feet square, and ten feet high, curtained in the like manner, and hung over with stalactites. In one corner of this chamber a small mound is formed about twelve feet in diameter, rising three feet from the floor, the top of which is hollow and full of water, from the dripping of stalactites above, some of which reach near the basin.

On descending from this chamber, you pass through another arch into a hall, by the side of which you see another basin of water, rising about four inches from the floor, formed in the same way, but of the shape, size, and thickness of a large tea-tray, full of the most pure and transparent water.

The number and spaciousness of the rooms, curtained and plaited with large plaits, extending along the walls from two to three feet from the roof, of the most perfect whiteness, and resembling the most beautiful tapestry, with which the rooms are embroidered, and the large drops of water, which are constantly suspended on the points of innumerable stalactites, which hang from the roof above, and the columns of spar resting on pedestals, which, in some places, appear to be formed to support the arches above—the reflections of the lights, and the great extent and variety of the scenery of this amazing cavern, form altogether one of the most pleasing and interesting scenes that was ever beheld by the eye of mortal man.

The traveller will find himself amply paid for diverging from his route to visit this beautiful town.

CAVERN AT TRENTON FALLS, NEW YORK.

It has long been known that there has existed in the vicinity of these falls a cave of considerable extent, although it has never been fully explored. On the 1st of July, 1836, in connexion with a number of young gentlemen from Oneida Institute, we examined it more extensively than had before been done. Its entrance is to be found at a distance of perhaps a mile and a half from the house, directly upon the creek, on the west side, and about two hundred yards from its bank.

Before entering, we entirely changed our dress, putting on old clothes which we had provided for the occasion, and took in our hands candles, hammers, hatchets, &c.,—a preparation which was afterward found to be essential to safety. We also left at the mouth some persons to build a fire,—a precaution which we would also recommend to others for their comfort on coming out. It is not convenient for more than three or four persons to enter at a time. Each one should carry a candle or other light, as it greatly facilitates the progress, and a single one is every moment liable to be extinguished. We were able to enter by stooping slightly; but the passage immediately contracts, so that but one person can pass at a time, and that only upon his hands and knees. The way is arched in the rock above, and has in its bottom a fissure of considerable depth, in which flows a stream of pure water. It is nearly horizontal, in a direction toward the creek, and uniform in size, except here and there, when it

is partially closed by pieces of rock which have fallen from above. At a distance of about ten yards from the mouth, this passage opens into the upper part of a circular room, about twelve feet in depth, which, from its figure, has been called "the Bottle." It presents nothing very remarkable. Ascending from this, the passage is continued forward, of the same form, and in the same direction as before, for a distance of thirty yards, when it is firmly closed by rocks. Here, however, the fissure in its floor is enlarged in several places. Through one of these openings we found a passage; and descending in the posture of a chimney-sweep, through a space of fifteen feet, we came to the channel of the brook. Following this, we found a straight and narrow route, in form and course like the one above, for forty yards. Through this it is necessary to go on the hands and knees a part of the distance, and occasionally lie flat down and crawl like a serpent, carrying one arm before with the candle, and applying the other closely to the side of the body; and even with this expedient, a person of greater than ordinary size might stick fast in the passage, and be unable to extricate himself without assistance. At length the way becomes wider and higher, and its sides begin to be covered with an incrustation of carbonate of lime, which being crystalline, presents, by the reflection of the light, a handsome appearance. Soon it expands more, and passes an apartment of considerable dimensions. Here all our toil was rewarded: our eyes were gratified with the sight of stalactites hanging in numbers from the roof, and running in ridges like little columns along the sides. The whole surface of the rock, and the pebbles on the floor, are covered with an incrustation, white in some parts, and brown in others, presenting an appearance truly beautiful. The stillness which reigns in this deep part of the cavern, in connexion with the thought that we are separated from the living world above by such a depth of solid rock, produces a peculiarly solemn impression on the mind, while the reverberation of our voices, returning upon our own ears in greatly magnified tones, causes a very singular sensation.

Passing still onward, the passage continues for many yards, of various dimensions, and as we crawled along, a pleasant sound, as of falling water, fell upon our ears; and, indeed, we soon entered a cavern larger than either of those we had seen, from the side of which issues a living spring, or a brook, which, like the one we followed, has found its way from the surface of the earth, and here falls from a ravine in a perfect sheet, like a cascade in miniature. This cavern was more beautiful than the former. Its sparry roof and walls, and its white pebbles, with the water reflecting in its fall the light of our candles, and breaking the profound stillness which would otherwise prevail, produce an effect altogether pleasant, and more easily imagined than described. The rill makes its way through the rock to the creek, but cannot be followed more than twenty feet from this cascade, the way being then closed by large stones. At this point bones were found, indicating it to have been the resort of beasts of prey. On starting to come out, our first impulse was to make extensive depredations on the incrusted walls and roof, but the recollection of the narrowness of the passage prevented, and we contented ourselves with taking one or two pieces of a foot or more in length, which we brought out singly; and filling a bag with smaller pieces, which we rolled along in the path before us, we arrived safe at the mouth of the cave, having been absent two and a half hours.

The whole distance we estimated at three hundred feet; the air was pure, and although cold and damp, our constant exercise kept up free circulation, and we sustained no injury, except the bruises received by our heads from the rocks. Thus, in addition to the well-known grandeur and beauty of the works of the Author of nature seen in this vicinity, we have viewed another curiosity fully

equal to the former, giving to the spot new interest and greater variety. True, it is difficult of access, but those who enter it will be richly paid for their labor: the lovers of adventure, by the novelty of so romantic a journey into the bowels of the earth; the mineralogist, by the rare and curious specimens which he will add to his cabinet.

EXTRAORDINARY CAVERN IN GEORGIA.

Upon the representation of the citizens of Lafayette, a small but growing village in the county of Walker, Georgia, my attention was drawn to a subterranean cavern, five or six miles from the above-named village; and being rather an admirer of the works of nature, curiosity prompted me, accompanied by five or six others, to visit it.

The company being met, with lighted torches we entered the cave, through a small aperture, descending a flight of natural stairs almost perpendicularly, some ten or twelve feet. The company having all got down safe, I could not avoid, in an ecstasy of admiration and wonder, exclaiming, "O Lord God Almighty, how wonderful are all thy works!" for we were then shown the grandest and most magnificent room that I have ever beheld, formed on each side with the utmost regularity, and ceiled overhead with a perfectly smooth surface; and being desirous of viewing as minutely as we could, from the amplitude of this anomaly of nature, its various curiosities, we raised a considerable light, and illuminated the room as far as we could by the means we had, when we discovered that an almost infinite number of stalactites had been formed by the almost continual dripping of the water, resembling in size and appearance various animal bodies.

Being somewhat satisfied with our examination of this apartment, with our hearts glowing with wonder, love, and praise to the Architect of nature, we moved slowly and rather pensively along this solitary and hitherto unexplored mansion, through devious wiles of "*incognita loca*," in quest of new discoveries.

Having reached the extreme end of this spacious dome, we found that to proceed farther we had to ascend stupendous and almost inaccessible heights, over craggy precipices and yawning gulfs, to the height of some fifty or sixty feet, when, by the dim light of our tapers, we discovered through a small opening another room less spacious but far more beautiful and picturesque;—for there appeared to the astonished beholder not only the representation of a part of the animal creation, but a true delineation of a great number of inanimate objects, such as cones, altars, pyramids, tables, candlestands, with a *fac simile* of some of nature's choicest productions; and it really appeared as if she, in her wild and playful moments, had intended to mock the curiosities of art. While gazing in dumb astonishment upon this delightful scenery, I was roused from my agreeable revery by a hollow and reverberating sound, produced by one of the company, who being of a bold and adventurous spirit, had gone unobserved into a remote part of the room, and beat with a stick, or something else which he held in his hand, several tabular spars, which echoed through this solitary mansion with almost deafening reverberations, which, by the association of ideas, reminded me in some degree of the masticating clangor of the copper bell.

THE GREAT CAVE OF INDIANA.

This cave is one of the most interesting objects to which the traveller in those regions can make a visit. It is distant from the pleasant little town of Corydon, the seat of justice of Harrison county, and former capital of the State, about eleven miles. It was a fine June morning when I started from this village with the intention of visiting it. The road passes through the barrens, presenting the usual views of woody islands, wide openings covered with flowers, deep sinks, thick rows of bushes and tangled vines shading the path, and a few clearings, with the burnt trees rising like tall black masts from seas of verdure. Seven miles from the town, near Wilson's Mill, the scenery is finely picturesque at the point where the road approaches Blue river. On the right is a precipitous ledge crowned with trees, and garlanded with creeping tendrils and flowering shrubs; at the left are the clear blue waters of the stream, visible for a mile, enclosing several small islands. Opposite are seen the magnificent sycamores of the river bottom, their boughs interlaced by gigantic grapevines; and beyond, a steep bluff terminates the view. In front, is a small plain, and the mill, its bridge, a plantation, and a variety of objects, complete the picture. Here I was cordially invited by Mr. Wilson to alight and visit a neighboring cave, which he described as equally interesting with one of which I was in search. We employed the time which remained till dinner, in visiting a remarkable spring, from which the stream proceeds that turns his mill. It is of a circular form, about one hundred and fifty feet in diameter, and of immense depth. The spectator who rests on its still bosom appears to be suspended between two firmaments, such is its clearness; and the fish with which it abounds are seen at the distance of many feet, as if sporting in air. Having dined and fortified ourselves with some excellent apple-brandy (excuse us, readers of the temperance society! agues are sometimes caught by such excursions in hot weather), we rode to the spot. The entrance is by an aperture like a well, about eight feet deep, which forms a semicircle around the mouth. Immediately within, the height is ten or twelve, and the breadth fifty feet.

This is the average size through its whole extent, which is probably half a mile. The bottom and roof are of solid rock, dry, and free from earth. Stalactites make their appearance at the very outset, and white concretions of lime, of marble hardness, rise at short intervals; one, to which the name of the Tower of Babel has been given, is of a cylindrical shape, and has the appearance of many small pillars winding spirally around it. Through the whole distance it is necessary to stoop but once, and then only for a short space. At the further end, the ceiling becomes higher, and the width extends to perhaps one hundred feet. Language is inadequate to describe the dazzling splendor of this part when brilliantly illuminated: thousands of sparry stalactites depend from above, some red, some yellow, some orange, some white, most of them transparent, many resembling branches, and others glistening as if varnished with diamonds. The pavement is formed of hard-knobbed concretions of a lemon color, and a pearly lustre, covered with shining fragments of spar, and every cavity lined with crystals, and gleaming like snow-crust in the sunshine; around are seen cones of the purest white, and massy pillars, some a foot in diameter, supporting the roof, and marble incrustations, like heavy drapery, sweeping down from its border.

On one side is the "curtained room," almost separated from the rest of the cavern by enormous columns, resembling the pipes of a huge organ; on the other, a grand mass, resembling a prodigious snow-heap, presents a majestic

appearance, and its large crystals seem as if chiselled by the hand of man. This, from a fancied resemblance of its top to a cap, is called the "old priest." All around is deep silence, undisturbed save by a tinkling sound of the drops, as they slowly gather, and fall from the hollow tubes. The spars are of three kinds; the icicles which project from the roof, and form the numerous columns, and which show in the interior concentric rings like the sawed-off branch of a tree, and are often hollow—a glistening incrustation covering the loose stones and the walls—the knobbed bunches of light yellow which form the flooring; all these, when fractured, which is not easily effected, display the same resplendent crystalline structure, and when struck, emit a glassy sound. They are of the kind by mineralogists termed calc sinter, and resemble those brought from the Grotto of Antiparos, but are more elegant than any that I have seen from thence. The cavern is often called "Pitman's Cave," as that is the owner's name, but "Oberon's Grotto," as it is sometimes styled, is far more appropriate. The most glowing visions of oriental fancy could not equal the magnificence of this subterraneous palace, when its gorgeous decorations are vividly lighted up. No one, who has any taste for the wondrous exhibitions of nature, should pass "Oberon's Grotto" without surveying its beauties. There is a romantic tradition connected with its discovery, which is generally credited, and the names of the parties are still told. A bear, pursued by a hunting-party, took shelter in this cavern; none of them dared to venture down. At length, a young lady, daughter to one of them, descended and shot the ferocious animal in its den. I trust it will not diminish the interest of the legend with my fair readers, when I relate that her father is said to have offered her a calico gown, as an inducement. Calico gowns were rare and expensive articles in those days; and it must ever remain in doubt, whether the love of dress, or the heroism of the western females of that day, influenced her decision. It was a perilous adventure, and one which few would wish to repeat, even for a calico gown.

The next morning, leaving my hospitable hosts, who well deserved the appellation which a neighbor bestowed upon them, of "whole-souled fellows," I rode to the Great Cave, four miles further. Blue river, which it is necessary to cross in going, is a lovely stream, about fifty yards wide, through whose transparent blue waters innumerable fish are seen sporting above its bright shells. Mr. Rothrock, a gentleman who resided near the cave, politely accompanied me. It lies in a region of broken country, possessing a few low bushes and scattered trees, to which barren ridges and a stony soil give a strange air of loneliness and desolation. The entrance is on the side of a small hill, and though wide, obliges one to stoop. After entering, the appearance is that of a vast excavation, whose bounds are scarcely discernible by the united aid of the torches, and the faint gleamings of daylight conveyed through the mouth. Its bottom, covered to the depth of several inches by the pulverized earth, interspersed with shining particles of Epsom salt, shelves gradually downward for some distance. It then becomes more level, covered with flat fragments of rock, and thus continues till the cave divides. The right branch soon terminates; the left passes on, sometimes through long arched passages, sometimes over high hills, and across wide gullies for a great distance. At length, after descending abruptly into a deep hollow, you find an immense pile of fragments, heaped confusedly on each other, blocking up the way. After ascending this with considerable exertion, you proceed by a rocky terrace, curving around the wall on one side, and a dark chasm on the other; then, by a ladder of a few rounds, you reach a vaulted gallery, nearly at right angles with the route by which you have come. Now stop—wave your torches of poplar bark briskly, and as the flames burst freely out, survey the wild, the almost fearful sublimity

of the scene around you. In front, and on each side, the rough walls overhang the path, and vast prominences of rock jet out, seeming as if a slight disturbance of the oppressive silence of the place would call them down in fearful avalanches. At your feet is a frightful abyss, which the eye vainly strives to explore: and far off in the distant obscurity is dimly seen the irregular mound over which you have reached your present station. High above, you have indistinct glimpses of the smooth limestone ceiling, whose mingled shades of blue and gray remind one of a clouded sky, seen at midnight from the recesses of some lonely ravine. Behind is the regular arch-way, whose sides and roof of beautifully variegated limestone contrast strikingly with the sombre aspect of the objects without. Through this the way continues to the "creeping place," where, as the name denotes, it is necessary to creep a few feet. Beyond this, for the distance of a mile and a quarter, the path is still more rugged and clogged with ruins, but with the same variety of hills, hollows, plains, and tunnels, to the very end. Near this, the eye of the visiter, fatigued with dwelling on a succession of objects of a rude and gloomy character, is agreeably relieved by a sight of exquisite beauty, which is rendered still more interesting by the circumstances in which it is seen. From the shadowy vista before him, a sparry concretion is revealed—a column of untarnished whiteness, thirty feet high, and fifteen in diameter. Its innumerable crystals reflect the torchlight in rainbow hues, and it stands a solitary island of lustre amid the surrounding darkness. The cave is supposed to terminate a short distance beyond this, and the explorer, wearily retracing his steps, gladly emerges from its damp saline vapors, and the suffocating smoke of the torches, to the refreshing breezes of the upper air. Its length is about three miles; the height and width, usually, (except at the "creeping place,") vary from twenty to one hundred and fifty feet. The principal productions are Epsom salts, saltpetre, nitrate of alumine, plaster of Paris, carbonate of magnesia, sulphate of iron. Epsom salts are seen in a state of efflorescence on the walls, but are chiefly obtained from the earth within.

REMARKABLE CHASM.

G. W. Kendall, Esq., one of the editors of the New Orleans Picayune, who was out with the Santa Fe Expedition, and taken prisoner by the Mexicans, gives the following interesting description of a remarkable chasm discovered by them on their journey.

The morning of the 3d September broke bright and cloudless, the sun rising from out the prairie in all his majesty. Singular as it may appear, nearly every shower we had came in the night, from the time we left Austin until we reached the Mexican settlements. We spent a couple of hours drying our blankets, saddled up, and pursued our journey.

We had scarcely gone six miles, before we suddenly came upon an immense rent or chasm in the earth, far exceeding in depth the one we had so much difficulty in crossing the day before. No one was aware of its existence until we were immediately upon its brink, when a spectacle, exceeding in grandeur any thing we had previously witnessed, came suddenly in view. Not a tree or bush, no outline whatever, marked its position or course, and we were all lost in amazement and wonder, as one by one we left the double-file ranks and rode up to the verge of the yawning abyss.

In depth it could not have been less than eight hundred or a thousand feet

from three to five hundred yards in width, and at the point where we first struck it, the sides were nearly perpendicular. A sickly sensation of dizziness was felt by all as we looked down, as it were, into the very depths of the earth. Below, an occasional spot of green relieved the eye, and a small stream of water, now rising to the view, then sinking beneath some huge rock, was bubbling and foaming along. Immense walls, columns, in some places what appeared to be arches, were seen standing, worn by the water undoubtedly, and so perfect in form that we could with difficulty be brought to believe that the hand of man was not upon them. The rains of centuries, falling upon an immense prairie, had here found a reservoir, and their workings upon the different veins of earth and stone had formed these strange and fanciful shapes.

Before reaching the chasm, we had crossed numerous large trails leading a little more to the west than we were travelling, and we were at once convinced that they all centred at a common crossing close by. In this conjecture we were not disappointed, for a trot of half an hour brought us into a large road, the thoroughfare along which millions of Indians, buffaloes, and mustangs had travelled for years. Perilous as the descent looked, we well knew there was no other near. The lead mule was again started ahead, the steadier and older horses were next driven over the sides, while the more skittish and untractable brought up the rear. Once in the narrow path which led circuitously down the deep descent, there was no turning back, and our maddened animals finally reached the bottom in safety. Several large stones were loosened from their fastenings by our men during the frightful descent. They would leap, dash, and thunder down the precipitous sides, and strike against the bottom far below us with a terrific crash.

We found a running stream at the bottom, and on the opposite side a romantic dell, covered with short grass and a few scattering cotton woods. A large body of Indians had encamped on this very spot but a few days previous, the wilted limbs of the trees and other "signs" showing that they had made it a resting-place. We too halted a couple of hours, to give our horses an opportunity to graze and rest themselves. The trail which led upon the opposite side was discovered a short distance above us, to the south, winding up the steep and ragged sides of the precipice.

As we journeyed along this dell, all were struck with admiration at the strange and fanciful figures made by the washing of the waters during the rainy season. In some places perfect walls, formed of a reddish clay, were seen standing; and were they anywhere else, it would be impossible to believe that other than the hand of man had formed them. The vein of which these walls were composed was of even thickness, very hard, and ran perpendicularly; and when the softer sand which had surrounded them was washed away, the veins still remained standing upright, in some places one hundred feet high and three or four hundred in length.

Columns, too, were there, and such was their architectural order, and so much of chaste grandeur was there about them, that we were lost in wonder and admiration. In other places the breast-works of forts would be plainly visible; there again the frowning turrets of some castle of the olden time. Cumbrous pillars of some mighty pile raised to religion or royalty were scattered about; regularity was strangely mixed up with ruin and disorder, and Nature had done it all. Niagara has been considered one of her wildest freaks; but Niagara sinks into insignificance when compared with the wild grandeur of this awful chasm. Imagination carried us back to Thebes, to Palmyra, and to ancient Athens, and we could not help thinking that we were now among their ruins.

Our passage out of this place was effected with the greatest difficulty. We

were obliged to carry our rifles, holsters, and saddle-bags in our hands; and in clambering up a steep pitch, one of the horses, striking his shoulder against a projecting rock, was precipitated some fifteen or twenty feet directly upon his back. All thought he must be killed by the fall, but, singular enough, he rose immediately, shook himself, and a second effort in climbing proved more successful—the animal had not received the slightest apparent injury.

By the middle of the afternoon we were all safely across, after spending five or six hours completely shut out from the world. Again we found ourselves upon the level prairie, and on looking back, after proceeding some hundred yards, not a sign of the immense chasm was visible. The waste we were then upon was at least two hundred and fifty miles in width, and two chasms I have mentioned were the reservoirs, and at the same time the conductors of the heavy quantity of rain which falls upon it during the wet season to the running streams. The prairie is undoubtedly the largest in the world, and the chasms are in perfect keeping with the size of the prairie.

ATMOSPHERIC PHENOMENA.

FORMATION OF CLOUDS.

[See pages 110, 111.]

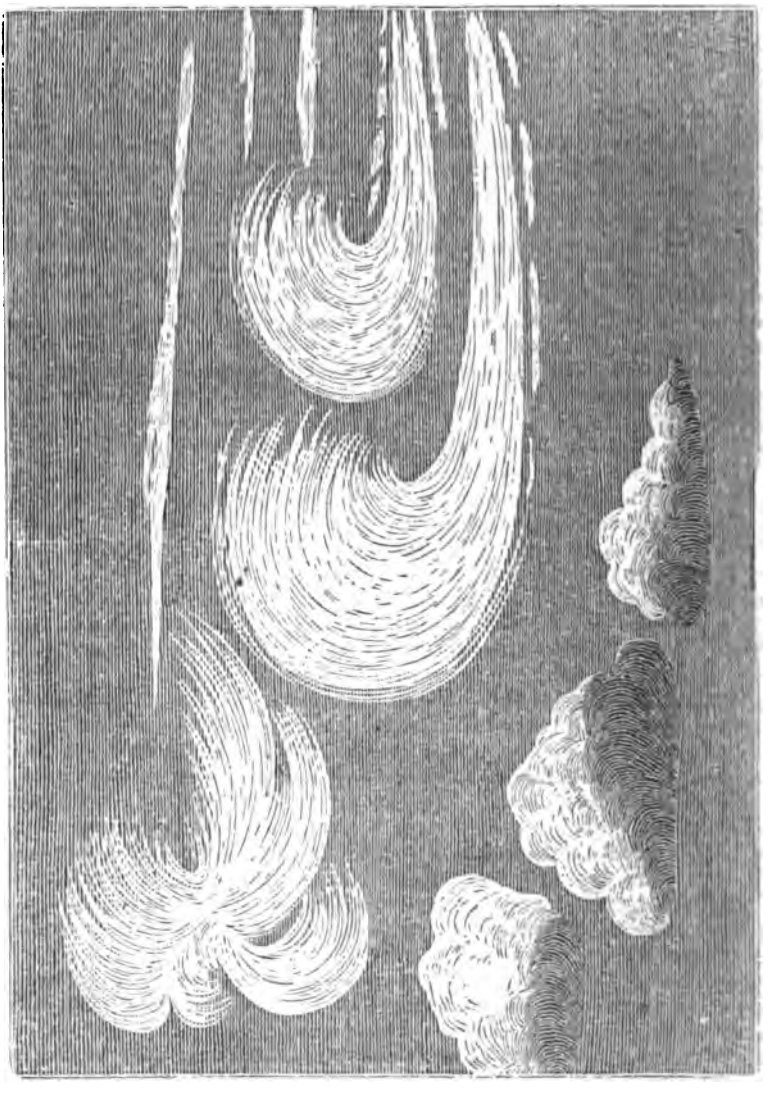
THE atmosphere is always pervaded by water in the form of transparent or invisible vapor, and the process of evaporation is continually carried on, except in cases where the thermometer is below what is called the dew point, or when the vapor is being condensed in the form of clouds, fogs, or rain. "Clouds and fogs are the same thing, being an assemblage of small vesicles of water floating in the atmosphere. At a distance in the atmosphere we see the whole as a cloud, but when the vapor sinks to the earth, or will not rise, and we are immersed in it, we call it a fog. Dew-fogs, which hang over fields, are *stratus* clouds; and fogs which involve elevated objects, are *cumulous* clouds." It is to circumstances of distribution, light, shade, distance, and perspective, that the great variety in the *appearance* of the clouds is owing; and on this variety of appearance the following classification has been founded, by which the clouds have been considered as pertaining to seven classes:—

1. Like a lock of hair, or a feather, called *cirrus*.
2. A cloud in conical or rounded heaps, called *cumulus*.
3. A horizontal sheet, called *stratus*.
4. A system of small fleecy or rounded clouds, called *cirro-cumulus*.
5. The wavy or undulating stratus, called *cirro-stratus*.
6. The cumulus and cirro-stratus mixed, called *cumulo-stratus*.
7. A cumulus spreading out in cirrus, and raining beneath, called *nimbus*.

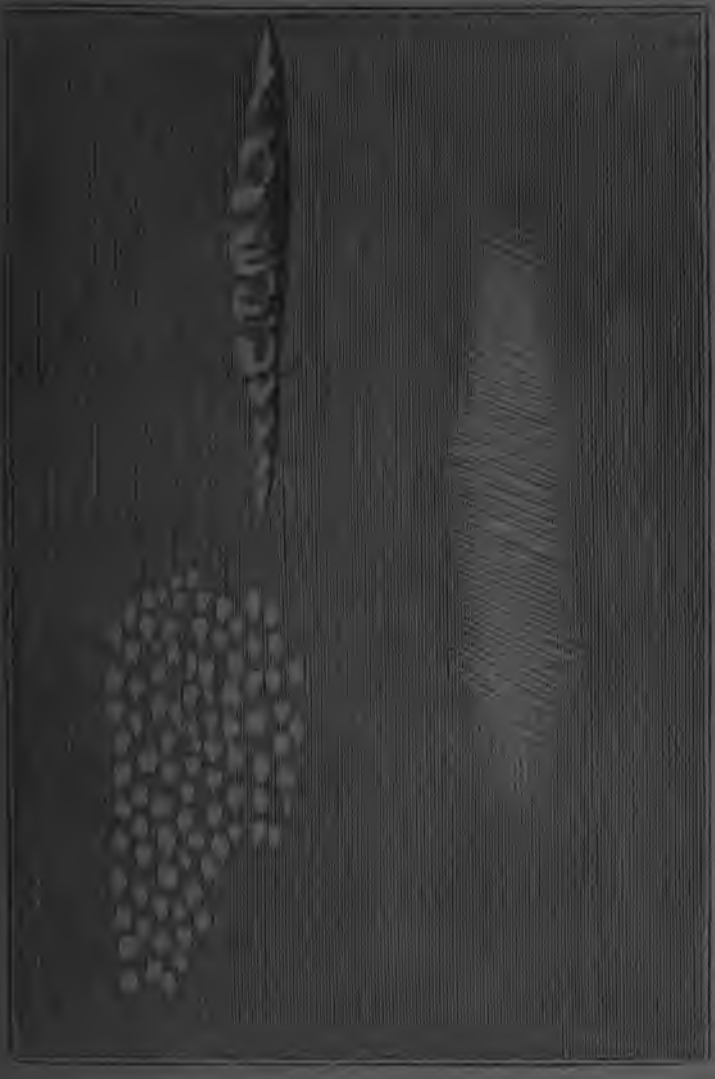
The cirrus is usually the most elevated—sometimes as a gauze veil or parallel threads. Its height is apparently from one to four miles.

Dew is the condensation of aqueous vapor upon the surface of a condensing body or substance. Clouds and fogs are watery particles condensed from aqueous vapor while floating in the atmosphere, where they continue to float till precipitated, or again dissolved. If by the concentration of these particles, or by any additional condensation, their weight be increased beyond that which the extent of their surface can sustain, they then descend in the form of rain; and as the condensation ordinarily increases as the drops increase in magnitude, it is common to have more rain fall on the surface of the ground than on an equal space upon the top of a house or church. Clouds, fogs, and rain are, therefore, essentially the same, the latter being the continuation or extension of the same process which produced the former.

Owing to the evaporating properties of the atmosphere in the higher regions, as well as to the intensity of cold which there uniformly prevails, distinct clouds are seldom, if ever, found at a greater elevation than the summits of the highest mountains, which is about five miles. At an intermediate region, however, the clouds are often at a temperature above freezing, while the air at the surface is much below the freezing point, and the earth covered with snow. This condition of the clouds seems not unfrequently evident by their appearance to the eye of an observer. Snowy or frozen clouds are usually dim and undefined in their aspect or appearance; and a fall of snow may not unaptly be termed the fall of a frozen cloud.



Formation of Clouds.



WATER-SPOUTS AND WHIRLWINDS.

The identity of whirlwinds and water-spouts was maintained by Franklin, and although at a later period this has been called in question, it appears to have been done without sufficient reason.

From the equal distribution of the atmosphere as the oceanic envelope of our earth, it results that no movement of great violence can take place in any of its parts, except by means of a direct circuit of rotation in the form of a vortex or active whirlwind.

A vortex will not be regularly formed, nor continue itself in action, without the aid of an external propelling force, and a constant spiral discharge from that extremity of its axis toward which is the tendency of motion. Both these conditions, it is believed, are fulfilled to the letter in the case of a common whirlwind or water-spout. The air at the upper extremity of the whirling column, owing to its elevation, is rarer than at the base, and the column itself, particularly in its central portions, is mechanically rarefied by the centrifugal effect of its own whirling motion. We have thus a sort of rarefied chimney, into which the denser air at the base of the column is continually forced by the pressure of the surrounding atmosphere; not to ascend in a separate current, as in the common chimney, but entering into the organization of the whirling vortex, to supply the place of the preceding portions of air which are winding inward and upward to be again discharged at the upper extremity. The condition of force by which the propulsion is maintained, is found in the pressure of the surrounding atmosphere upon all sides of the mechanically rarefied column, and if the expansive whirling motion be sufficiently active to produce nearly a vacuum at the centre, the external propelling force will be nearly fifteen pounds to the square inch; and as the whirling column turns within its own compass like a top or any other rotative body, this force is quite sufficient to account for all the violence that is ever produced.

Were there no vorticular or whirling action already excited, and no discharge from the upper extremity of the vortex, the external pressure could not produce continued rotation; but this movement and upward discharge having once commenced, from any cause, the particles near the exterior of the column, like those of water in a funnel, yield at a little more than a right angle, to the external pressure, in their spirally approximating course toward the rarefied centre. By the slowness of this central approximation as compared with the whirling action, the intensity or magnitude of the external pressure becomes gradually merged in the velocity of the rotative action. As the area of the spiral circuit decreases rapidly as we approach the centre, it follows that the velocity of the whirling movement must be proportionably increased, as we perceive it to be in the funnel and in all regular formed vortices. Thus, if the rotative velocity near the exterior of a whirling column be at the rate of but ten miles an hour, at one third nearer the centre the velocity must be more than doubled, and at two thirds of the distance from the first named point to the centre, the absolute whirling velocity must be increased ninefold, which in this case is equal to ninety miles an hour; and in consequence of the reduced diameter of the circuit of gyration at the last point, the number of revolutions must here be as four hundred to one at the point first mentioned. The increased ascending velocity, however, is not here taken into account, which may perhaps reduce the number of comparative revolutions in the central portions of the column.

It is not intended to dwell here upon the causes by which whirlwinds and spouts are excited or first set in motion, but local disturbances in a heated stra-

can, at the points where the same is beginning to be penetrated by the colder air of a higher stratum, are probably the chief exciting causes, as in thunderstorms. The spouts of heat may also be effective in continuing the upward discharge and vorticular organization, in cases where there is great disparity in the temperatures of the air at the upper and lower extremities of the whirling mass or column, but it is to the mechanical expansion caused by the centrifugal source and the powerful impulse of the external atmospheric pressure, that the increased and powerful activity of the whirlwind is chiefly to be referred.

The term *water-spout* is undoubtedly a misnomer, as there is no effect produced of which this term is properly descriptive, although the term *air-spout* would not be greatly inappropriate. The visible column of condensed vapor which often appears in the rarefied centre of the vortex, when the latter is not sufficiently in cloud, has probably given name to this meteor. But the water of the sea is not taken up by the spout or whirlwind, except in a slight degree, and in the form of fine spray, like other light matter which is swept from the surface. This cloudy stem or column frequently appears and disappears, while the action of the whirlwind continues without any important change. Owing to this fact, observers sometimes believe that they witness the commencement of a water-spout, or tornado, when the same has previously been in action for one or more hours; and when the cloudy pipe or pillar happens to disappear, the spout is supposed to have "burst," while often it has undergone no important change, except, perhaps, a slight decrease in its activity. The active and violent portion of the whirlwind surrounds the spout invisibly, and is probably of much greater diameter at a distance from the surface of the earth than at the base of the spout. Thus, when a spout or whirlwind has passed near a ship, the upper spars have been converted into wreck, while no violence of wind was felt on the deck.

Water-spouts follow the course either of the surface wind or of the higher current with which they may communicate, or their course may be modified by both these influences without being absolutely determined by either. They should most, however, in those calm regions which are found at the external limits of the trade winds, and in the regions near the equator.

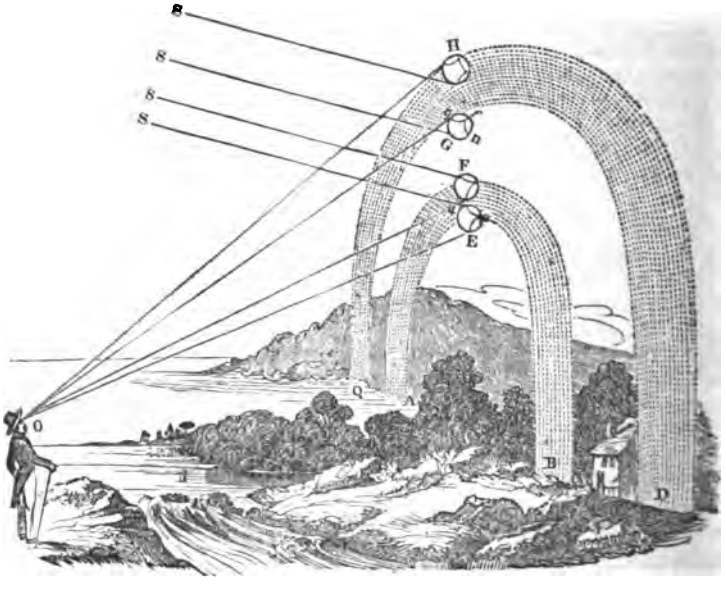
It has been common to ascribe whirlwinds and water-spouts, as well as larger whirlwind storms, to an impulse produced by the meeting of contrary currents, but the laws of distribution and of motion in an oceanic body, are such as do not permit the movements of its different currents and gyrations to meet in conflict with each other; besides, any conflicting movement in the air would necessarily produce a rise in the barometer, whereas it is generally known to fall at the commencement of a storm or whirlwind, either of large or small extent. We may observe, also, that whirlwinds and spouts appear to commence gradually, and to acquire their full activity without the aid of foreign causes; besides, it is well known that they are most frequent in those calm regions where, apparently, there are no active currents to meet each other, and they are least frequent where currents are in full activity.

THE RAINBOW, OR IRIS.

Nature, in all the varied aspects of her beauty, exhibits nothing more attractive than this phenomenon.

Among the Hebrews this appearance was denoted by a word which signifies the "Bow of God;" and among the Greeks, by one signifying "Daughter

of Wonder." It never takes place but when a cloud, opposed to the shining sun, dissolves in rain, from which it follows that to observe this spectacle the back of the spectator must be turned toward the sun. Frequently there are two bows or arches; an inner one, in which the colors are more vivid, and an outer one, in which they are paler. Each exhibits the same series of colors as the image produced by the prism, namely, red, orange, yellow, green, blue, indigo, and violet; but red is the uppermost color in the interior bow, and violet in the exterior bow. Both the bows depend, though with some difference, upon the refraction of light combined with its reflection; and they are never seen but when the incident rays form, with the emergent rays, angles of certain magnitudes. The rays of light which render the inner bow visible, are conveyed from the sun to the eye by two refractions and one reflection; and those which show the outer bow, by two refractions and two reflections. The rainbow had been often seen, and for ages had excited both admiration and surprise, before any rational method of accounting for it had been proposed. The priests of some of the ancient idolaters always preferred the wood on



The Rainbow, or Iris.

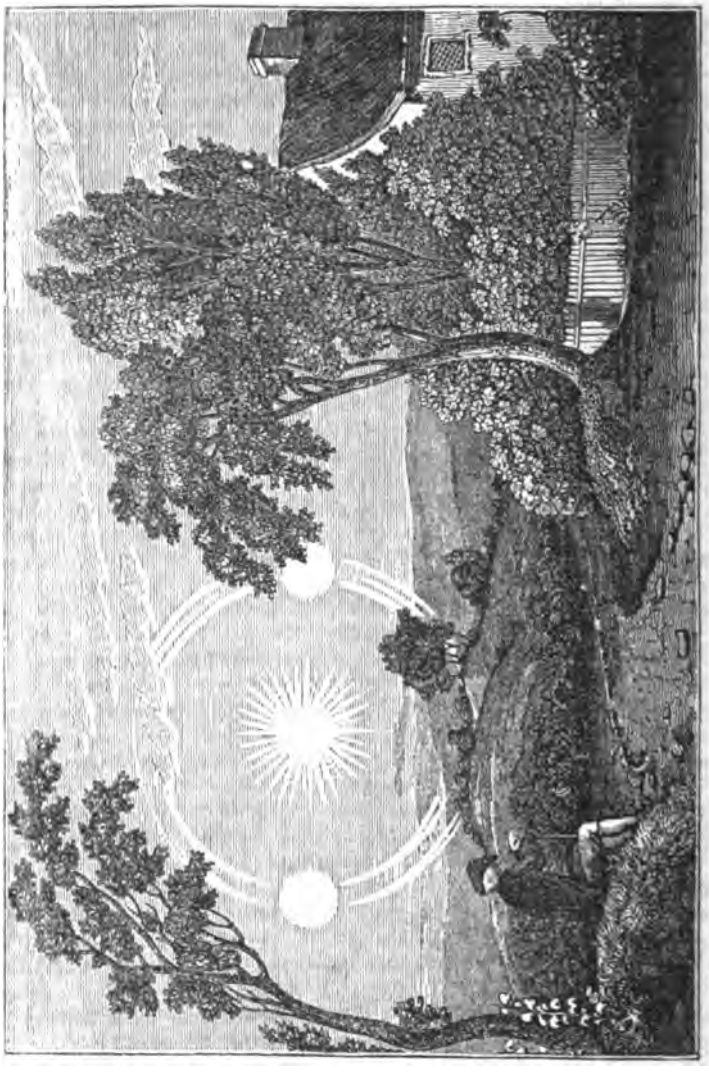
which the rainbow had appeared to rest for the burning of their sacrifices, vainly supposing that this wood had a perfume peculiarly agreeable to their deities. At length, Kepler, who lived in the sixteenth century, supposed that it might arise from the refraction of the sun's rays upon entering the rain-drops; and Antonio de Dominis, a Dalmatian bishop, improving upon Kepler's hint, succeeded, in a great degree, in his attempt to explain the rainbow philosophically. He imitated the phenomenon by means of a glass globe, which showed that the rays of light were reflected as well as refracted. Des Cartes improved

his statement, and gave, in general, more precision in the mode of tracing the progress of the rays. And, finally, Newton added the degree of accuracy that was wanting, by analyzing the distribution of the coloring, which is the main principle of this phenomenon. The accompanying figure and explanation will show how, upon this theory, the whole is accounted for.

In the inverse bow, let E F be two drops of the falling rain, and let S a be a ray of light falling on the drop E, from, from whence it is refracted first to *n*, thence is reflected to E, whence it is a second time refracted to the eye, suppose at O. In like manner, the same thing happens in the upper part of this bow, in the drop F. The angle C O E, 40° 2′, is the greatest in which the most refrangible rays can, after one reflection, be refracted to the eye; and therefore all the drops in the line O E send the most refrangible rays most copiously to the eye, and thereby strike the senses with the deepest violet color in that region. In like manner, the angle C O F, 40° 17′, is the greatest in which the least refrangible rays can, after one reflection, be refracted to the eye; and, therefore, all those least refrangible rays come most copiously to the eye in the line O F, and strike the senses with the deepest red in that region. By reason of the intermediate degrees of refrangibility of rays coming from the drops between E and F, the space between E and F is painted with proper intermediate colors, and, therefore, the whole face of the bow will be tinged with all the colors in their natural order, namely, violet, indigo, blue, green, yellow, orange, red, and red from E proceeding to F.

The phenomena of the upper or external bow Q H D are thus produced; let H and H be two drops in the extreme parts of it; let S G be a ray falling on the drop in G, whence it is first refracted to *n*, from thence it is first reflected to f, from F it is a second time reflected to *g*, and from g it is a second time refracted to the eye, at O. The same is to be understood in the upper drop H; hence the angle C O *g*, 50° 42′, is the least angle in which the least refrangible rays can, after two reflections, be refracted to the eye; and, therefore, the drops in the line O *g*, shall strike the eye with the deepest red, and the angle C O H, 54° 22′, is the least angle, in which the most refrangible rays, after two reflections, can emerge out of the drops; and therefore those rays come most copiously from the drops in the line O H, and strike the senses with the deepest violet in that region. And, by the same reasoning, the drops between O H strike the senses with the intermediate colors; and so the colors in the whole width of the upper bow lie in this order from G to H, namely, red, orange, yellow, green, blue, indigo, violet, contrary to the order of those in the lower bow. The colors in the outer bow are fainter than those of the interior one, because the rays of light are twice reflected in the drops of the former, but only once in those of the other, the light becoming fainter by every reflection. The appearance of rainbows is always circular, and all of the same apparent dimensions, because no bow can be produced but under angles of the same magnitudes; but different portions are seen at different times, on account of the varying altitudes of the sun. When that luminary is in the horizon, half the bow is visible but less when he is higher. In the winter, the bow may be seen at any time of the day; but it is invisible some parts of the day in summer, that is, whenever the altitude of the sun is greater than 42½ degrees.

Besides the ordinary rainbows, there are others occasionally noticed, as the lunar bow, occasioned by the moon; the marine bow, which appears at sea in the water which the wind carries off the tops of the waves, of which many are seen together, and have their curved parts turned toward the sun, and their ends upwards; the terrestrial bow, which is caused by the refraction of the sun's rays in drops of dew on the grass, change their place with the beholder, have the convex parts next the eye, and are of different curves according to the height of the sun.



ATMOSPHERICAL PHENOMENA OF THE MOCK SUNS.

ATMOSPHERICAL PHENOMENA OF THE PARHELIA, OR MOCK SUNS.

(See page 116.)

On the 5th of February, 1674, near Marienburg, in Prussia, the sky being everywhere serene, the sun, which was still some degrees above the horizon, was seen to lance not very long and reddish rays, forty or fifty degrees toward the zenith, notwithstanding it shone with great lustre. Beneath this planet, toward the horizon, there hung a somewhat dilute small cloud, at the inferior part of which there appeared a mock sun, of the same apparent size with the true sun, and of somewhat a red color. Soon after, the true sun descending gradually in the horizon, toward the said cloud, the spurious sun beneath it grew clearer and clearer, insomuch that the reddish color in this apparent solar disc vanished, and put on the genuine solar light, in proportion as it was approximated by the genuine disc of the sun. The latter at length passed into the lower counterfeit sun, and thus remained alone. This phenomenon was considered the more extraordinary, as it was perpendicular under the sun, instead of being at its side, as parhelia usually are; not to mention the color, so different from that which is usual in mock suns, nor the great length of the tail cast up by the genuine sun of a far more vivid and splendid light than parhelia used to exhibit. This appearance was soon followed by an exceedingly intense frost, which lasted till the 25th of March, the whole bay being frozen up from the town of Dantzic to Hela in the Baltic Sea.

On the 25th of August, 1698, about eight o'clock in the morning, there were seen, at Sudbury, in England, three suns, which were then extremely brilliant. Beneath a dark watery cloud in the east, and nearly at its centre, the true sun shone with such strong beams, that the spectators could not look at it; and on each side were the reflections. Much of the firmament was elsewhere of an azure color. The circles were not colored like the rainbow, but white; and there was also at the same time, higher in the firmament, and toward the south, at a considerable distance from the other phenomena, the form of a half moon, but apparently of double the size, with the horns turned upward. This appearance was within of a fiery red color, imitating that of the rainbow. These phenomena failed gradually, after having continued about two hours.

Two mock suns, an arc of a rainbow inverted, and a halo, were seen at Lyndon, in the county of Rutland, on the 22d of October, 1721, at eleven in the morning. There had been an aurora borealis the preceding night, with the wind at west-south-west. The two parhelia, or mock suns, were bright and distinct, and in the usual places, namely, in the two intersections of a strong and large portion of a halo, with an imaginary circle parallel to the horizon, passing through the sun. Each parhelion had its tail of a white color, and in direct opposition to the true sun; that toward the east being 20 or 25 degrees long, and that toward the west 10 or 12 degrees, both narrowest at the remote ends. The mock suns were evidently red toward the sun, but pale or whitish at the opposite sides, as was the halo also. Still higher in the heavens, was an arc of a curiously inverted rainbow, about the middle of the distance between the top of the halo and the vertex. This arc was as distinct in its colors as the common rainbow, and of the same breadth. The red color was on the convex and the blue on the concave of the arc, which seemed to be about 90 degrees in length, its centre being in or near the vertex. On the top of the halo was a kind of inverted bright arc. This phenomenon was seen on the following day,

and again on the 26th. On the 11th of the preceding month, (September,) a very splendid and remarkable aurora borealis, presenting truly unaccountable motions and removals, was witnessed in Rutlandshire, in Northamptonshire, and at Bath.

METEORS OF 1833.

[See page 119.]

THE following description of this very interesting phenomenon was written at the time of its occurrence, by Professor Olmsted of New Haven.

About day break this morning (Nov. 13th, 1833) our sky presented a remarkable exhibition of Fire Balls, commonly called *Shooting Stars*. The attention of the writer was first called to the phenomenon about half past five o'clock; from which time until near sunrise, the appearance of these meteors was striking and splendid, beyond any thing of the kind he has ever witnessed.

To form some idea of the phenomenon, the reader may imagine a constant succession of fire-balls, resembling sky-rockets, radiating in all directions from a point in the heavens, a few degrees south-east of the zenith, and following the arch of the sky toward the horizon. They commenced their progress at different distances from the radiating point, but their directions were uniformly such, that the lines they described, if produced upward, would all have met in the same part of the heavens. Around this point, or imaginary radiant, was a circular space of several degrees, within which no meteors were observed. The balls, as they travelled down the vault, usually left after them a vivid streak of light, and just before they disappeared, exploded, or suddenly resolved themselves into smoke. No report or noise of any kind was observed, although we listened attentively.

Besides the foregoing distinct concretions, or individual bodies, the atmosphere exhibited *phosphoric lines*, following in the train of minute points, that shot off in the greatest abundance in a north-westerly direction. These did not so fully copy the figure of the sky, but moved in paths more nearly rectilinear, and appeared to be much nearer the spectator than the fire-balls. The light of their trains, also, was of a paler hue, not unlike that produced by writing with a stick of phosphorus on the walls of a dark room. The number of these luminous trains increased and diminished alternately, now and then crossing the field of view like snow drifted before the wind, although in fact their course was toward the wind.

From these two varieties, the spectator was presented with meteors of various sizes and degrees of splendor: some were mere points, but others were larger and brighter than Jupiter or Venus; and one, seen by a credible witness before the writer was called, was judged to be nearly as large as the moon. The flashes of light, although less intense than lightning, were so bright as to awaken people in their beds. One ball that shot off in a north-west direction, and exploded a little northward of the star Capella, left, just behind the place of explosion, a phosphorescent train of peculiar beauty. This line was at first nearly straight, but it shortly began to contract in length, to dilate in breadth, and to assume the figure of a serpent drawing itself up, until it appeared like a small luminous cloud of vapor. This cloud was borne eastward, (by the wind, as was supposed, which was blowing gently in that direction,) opposite to the direction in which the meteor had proceeded, remaining in sight several minutes.

The light of the meteors was usually white, but it was occasionally prismatic, with a predominance of blue.

The weather had sustained a recent change. On the evening of the 11th, a very copious southerly rain fell, and on the 12th, a high westerly wind prevailed by gusts. Last evening the sky was very serene; a few "falling stars" were observed, but they were not so numerous as to excite particular attention.

THE SPECTRE OF THE BROCKEN.

[See page 121.]

GERMANY and her forests have ever been the land of marvel and romance. Events in her history have exceeded the wildest pictures of imagination; her legends are as numerous as they are dark and wild; and although the fiction-makers of this age are supposed to have outstepped the bounds of probability or possibility, yet many scenes have occurred which could not receive additional intensity from the pen of the poet or novelist. The Harz Mountains are known full well as the chosen scenes of resort for witches, demons, and apparitions; and their sports and pastimes on the heights of the Blocksberg or Brokenberg, are recollected amongst their ancient and favorite traditions; but, unfortunately for the lovers of wonders, these spectral appearances have been clearly explained. It may not be irrelevant, however, to introduce the German tradition of the subject, explaining the origin of the witch dance on the Brocken.

Charlemagne, a name renowned in wizard-story, had found all his pious endeavors to convert the Saxons ineffectual. The heathens retired before his arms into their woods and fortresses, and as soon as they found themselves beyond his reach, resumed their horrid rites and pagan worship. To put a stop to these impieties, the Christian emperor stationed guards at the passes of the mountains, when the season of the heathen festivals approached; but the Saxons eluded his soldiers by a very ingenious contrivance. They arrayed themselves in the skins and horns of beasts, and wielding fire-brands and rude clubs, presented themselves in this terrific guise to the guards, who, conceiving them to be so many demons, took to flight, and spread abroad a variety of appalling stories of the spirits which haunted the Brocken and other inaccessible spots.

Among the Harz mountains, there is an exceeding lofty one, which rears its head far above the rest, and overlooks all the country fifteen miles around. It is called the Brocken; but when we talk of the incantations and demon rites which were performed here in heathen times, and are said to be still practised by those wretches who have sold themselves to the prince of darkness, we call it the Blocksberg. Upon its cold and barren summit, which glitters all over with a thousand millions of rock-crystals, is held an annual festival, on the night between the last day of April and the first of May, well known by the name of Walpurgi's night, to which all the witches and magicians on earth are invited. As soon as midnight has tolled, the guests begin to arrive from all quarters, upon brooms, and pitchforks, and giants' bones, and other strange steeds; and the host himself brings along with him not a few to the entertainment. When all are met, an immense bonfire is lighted up, and a wild dance commences; afterwards, is delivered a blasphemous harangue, at the conclusion of which a supper, consisting wholly of sausages, is served up upon the witches'-altar. The hag who reaches the scene last meets with a dreadful punishment, to serve as a warning to all the rest; for after a warm embrace from the prince of darkness, she is suddenly torn in pieces, and her flesh is scattered over the

witches'-altar. At the first blush of morning the whole assembly disperses. The peasants dwelling in the neighborhood of the Brocken, on the approach of Walpurgi's night, draw the sign of three crosses on all their doors, being firmly persuaded that it is only by using this precaution they can protect themselves from the bad designs of the unholy assembly.

M. Haue has, however, divested the spot of that romantic interest which arises from a belief in supernatural visitations, and has given this as an illustration of the oft illusive appearance in the atmosphere, from the variable temperature of which it has different refractive powers, and this is the usual cause of that phenomenon called *mirage*, often seen in the deserts of Africa. A talented writer observes, that light passing through a vacuum, or a medium of equal density, moves in right lines; but when it enters a medium of different densities, in curves. If a ray of light passes from an attenuated to a very dense medium, a portion of light will be reflected, and a part refracted. These several causes acting upon light, bending and distorting its rays, produce a variety of singular optical deceptions, sometimes throwing the images of bodies upon dense clouds, and at other times investing terrestrial phenomena with unnatural and almost magical appearances.

In all climates exposed to an extreme temperature, whether of heat or cold, the results of unequal refraction are observed. In the deserts, the traveller is often surrounded with appearances which cheer his drooping spirits; and the chilled voyager, in arctic climes, beholds before him mighty cities, with their towers and battlements, which, alas! can give him no shelter, for they are but the distorted forms of icebergs. Many instances of the appearances of ships in the air are upon record: Dr. Vince saw one at Ramsgate. Its topmast, approaching the shore, was just seen above the water in the horizon, and immediately above it in the sky two images of the whole vessel, one erect and one inverted. But as the ship came into view, the images became less distinct, though they were both visible after the ship had risen above the horizon. This eminent philosopher states that, at Ramsgate, he has seen in the air the four turrets of Dover Castle, over a hill between Dover and Ramsgate; but the most remarkable was that which he observed on the evening of the 6th of August, 1806, when the image of the castle was so vividly projected on the Ramsgate side of the hill, that the hill itself could not be observed through the image.

The Brocken, a peak of the Harz mountains in Hanover, rises to the height of about 3300 feet above the level of the sea. M. Haue, who had long been anxious to view the aerial phenomenon which so much engrossed the fears of the peasant, ascended the mountain thirty times for the purpose, without success. On the 23d of May, 1797, he was early on the summit of the mountain, waiting the sun-rise; and about four o'clock the sun rose serenely from the east; its rays could pass without any obstruction over the Heinrichspohe Mountain. The sky was beautifully clear, and the rays of the morning sun were tinging the summit of the hills with its golden hues; when he observed on a cloud, in a direction opposite to that on which the sun rose, towards the Achtermannshoe, a gigantic human figure, of monstrous size, with his face towards him. When gazing on the prodigious spectre with feelings not free from terror, a sudden, long gust of wind threatened to blow off his hat, but in moving his hand towards his head, in order to detain it, the colossal spectre, lifting his ponderous arm, mimicked the action. The pleasure which he felt at this discovery can hardly be described, for he had already walked many a weary step in hopes of seeing this shadowy image. He changed his attitude and place, and found that the figure, like the monster in Frankenstein, always followed his move-

scene. He bowed and lifted his hands, and the gigantic form in derision did the same. He was desirous of again doing the same, but the colossus had vanished!

He remained some time in the same position, waiting to see whether it would again return, and in a few minutes the mighty monster made its appearance on the Achtermannshöhe. M. Haue was then joined by a person who had accompanied him to the top of the mountain, and both taking the position which our informant had occupied alone, a second colossal being made its appearance, and soon afterwards a third. They repeated their compliments by bending their bodies as we did, afterwards they "vanished from the sight." The phenomenon was frequently very weak and faint, sometimes strong, and well defined. The figures first seen were evidently produced by the projection of the shadow of the two persons upon the clouds, by the horizontal rays of the sun. The appearance of the third figure was, no doubt, caused by the duplication of one of the figures by the unequal refraction of the atmosphere.

AURORA BOREALIS.

(See page 194.)

We often see in the north, near the horizon, usually a short time after sunset, a dark segment of a circle, surrounded by a brilliant arch of white or fiery light; and this arch is often separated into several concentric arches, leaving the dark segments visible between them. From these arches, and from the dark segment itself, in high latitudes, columns of light, of the most variegated and beautiful colors, shoot up toward the zenith, and, sometimes, masses like sheaves of light are scattered in all directions. The appearance is then splendid; and its magnificence is announced by a general undulation of the masses of light. A kind of fiery corona is afterward formed about the zenith, by the meeting of all the columns of light, resembling the knob of a tent. At this moment the spectacle is magnificent, both for the multiplicity and beauty of the columns which the aurora presents. The light, after this, grows fainter and more tranquil. This calmness and tranquillity, however, are only temporary; for the phenomena are soon repeated in all their beauty—the oscillation of the columns of light, the formation of the corona, and the like, though with a thousand variations. At length, the motion wholly ceases, the light is collected about the northern horizon, the dark segment vanishes, and nothing is left but a strong resplendence in the north, which is lost in the dawning day. These brilliant appearances are often attended, in high latitudes, with loud noises, described as resembling the hissing and crackling of fire-works. This appearance has received the name of *northern light*, because, on account of our position on the earth, we see it only about the north pole. A similar appearance, aurora australis, was seen about the south pole, in 1773, by Cook's sailors, between 58° and 60° S. lat.; and later travellers have observed the same. These phenomena might, therefore, properly to be called *polar lights*.—Philosophers are of different opinions as to the cause of the aurora. It is, however, satisfactorily ascertained to be within the region of our atmosphere. Hell ascribed it to the reflexion of the sun and moon by the clouds of snow and needles of ice, which are constantly floating in the atmosphere of the frigid zones. Mairan supposed it to proceed from the atmosphere of the sun. Bailly ascribed it to magnetism, and its remarkable influence on the needle has been generally observed. Franklin attributed it to electricity. Hiot, who was sent to the Shetland

AURORA BOREALIS.

islands, in 1817, by the French Academy of Sciences, to determine the length of the pendulum vibrating seconds, had an opportunity, Aug. 27 of the same year, of observing the aurora borealis, in all its splendor, at the island of Unst. On this occasion, he ascribed to the phenomenon a volcanic origin. An ingenious hint of Kastner is deserving of attention. He considers polar lights as the electricity of the earth rising periodically to the poles.

ASTRONOMY.

APPEARANCE OF THE HEAVENS.

(See pages 126, 127.)

THE engraving represents the heavens, in which the Solar System is considered as forming part, and, in order to contemplate a spectacle so grand, let us imagine ourselves upon some high elevation, in an open country, where the view is uninterrupted on every side. The best time for this purpose, is upon the setting of the sun, when the western sky is faintly illuminated; at which time, we shall see this light fade away by degrees, the darkness increase, night come on, and the sky will appear a vast dome, studded with a multitude of brilliant points. These are the stars, which the too strong light of the sun has prevented us from perceiving during the day. The disposition of these stars seems to be immutable—which is essentially the same now as it was in periods the most remote. The different clusters are such in their configurations as the ancients described them when they grouped them together under the name of *constellations*, and, to assist the memory, associated them with the figures of men, animals, &c. But these stars, while they preserve the same order, are carried round the heavens as by a common motion. Those towards the west decline more and more, and disappear when the sun sets; while others, presenting themselves in the east, seem to come from beneath the horizon. Rising at different heights in the heavens, they descend again, and set in their turn, like those which preceded them. But if, in our latitude, we place ourselves in such a manner as to have the east on our right, and the west on our left, we shall see, in that part of the heaven which is before us, and which we call north, some groups of stars which seem set; such, for example, is the remarkable collection called the "*Great Bear*." This constellation, and the greater part of those which are found in that part of the heavens, disappear only when their light is lost in that of the sun. They may be seen during the whole of the night, and followed through the lowest part of their course, for they never descend to the horizon. If observed at different times of the night, they will be found to have their positions in the heavens reversed—the natural effect of the rotary movement, which they have in common with all the other stars; and the centre, about which they move, is a point of the heavens situated directly north.

The light that appears in the east at the approach of day, soon becomes strong enough to eclipse the stars which have just risen in that direction; the west is now in darkness, and the scene is the reverse of that which happens at the beginning of the night. The light continuing to increase, the stars grow

APPEARANCE OF THE HEAVENS.

fainter and fainter, till they at length disappear, and day sheds its brightness upon every object. The sun now presents itself, is seen in the east like the stars; it ascends and passes through the heavens, declines to the west,* and disappears in the part opposite to that in which it rose—when all the phenomena of night are repeated in the manner just described.

By examining the heavens for a number of nights successively, we observe certain *stars* change their places with regard to others; passing from one constellation, they pass towards another, which, for a few days, is scarcely perceptible. But these small changes at length become apparent, and the *stars* in which they take place are transferred to different parts of the heavens, on which account they are called *planets*, or wandering stars, to distinguish them from those which preserve the same relative situation, and which are called fixed stars.

TELESCOPIC APPEARANCE OF THE MOON.

The moon is the constant attendant of the earth, and revolves around it in twenty-seven days eight hours, but the period from one new moon to another is about twenty-nine days twelve hours. She is the nearest of all the heavenly bodies, being only about 240,000 miles distant from the earth. She is much smaller than the earth, being only 2180 miles in diameter, while that of the earth is about 7930. Her surface, when viewed with a telescope, presents an interesting and variegated aspect, being diversified with mountains, valleys, rocks, and plains, in every variety of form and position. Some of these mountains form long and elevated ridges, while others, of a conical form, rise to a great height from the middle of level plains; but the most singular feature of the moon, is those circular ridges and cavities which diversify every portion of her surface. A range of mountains, of a circular form, rising three or four miles above the level of the adjacent districts, surrounds, like a mighty rampart, an extensive plain; and, in the middle of this plain or cavity, an insulated conical hill rises to a considerable elevation. Several hundreds of these circular plains, most of which are considerably below the level of the surrounding country, may be perceived with a good telescope, on every region of the lunar surface. They are of all dimensions, from two or three miles to 40 miles in diameter; and if they be adorned with verdure, they must present to the view of a spectator, placed among them, a more variegated, romantic, and sublime scenery than is to be found on the surface of our globe. An idea of some of these scenes may be acquired by conceiving a plain of about a hundred miles in circumference encircled with a range of mountains of various forms, three miles in perpendicular height, and having a mountain near the centre, whose top reaches a mile and a half above the level of the plain. From the top of this central mountain, the whole plain, with all its variety of objects, would be distinctly visible, and the view would appear to be bounded on all sides by a lofty amphitheatre of mountains, in every diversity of shape, rearing their summits to the sky. From the summit of the circular ridge, the conical hill in the centre, the opposite circular range, the plain below, and some of the adjacent plains which encompass the exterior ridge of the mountains, would form another variety of view; and a third variety would be obtained from the various aspects of the central mountain and the surrounding scenery, as viewed from the plains below.

* This is the common language made use of in astronomy, but the sun's appearing to rise and set is caused by the revolution of the earth on its axis, once in every twenty-four hours.

Telescopic appearance of the Moon.

The lunar mountains are of all sizes, from a furlong to five miles in perpendicular elevation. Certain luminous spots, which have been occasionally seen on the dark side of the moon, seem to demonstrate that fire exists in this planet; Dr. Herschel and several other astronomers suppose they are volcanoes in a state of eruption. The bright spots on the moon are the mountainous regions; the dark spots are the plains, or more level parts of her surface. There may probably be rivers, or small lakes, on this planet; but there are no seas or large collections of water. It appears highly probable, from the observations of Schroeter, that the moon is encompassed with an atmosphere, but no clouds, rain, or snow, seem to exist in it. The illuminating power of the light derived from the moon, according to the experiments made by Leslie, is about 300,000th part of the illuminating power of the sun.

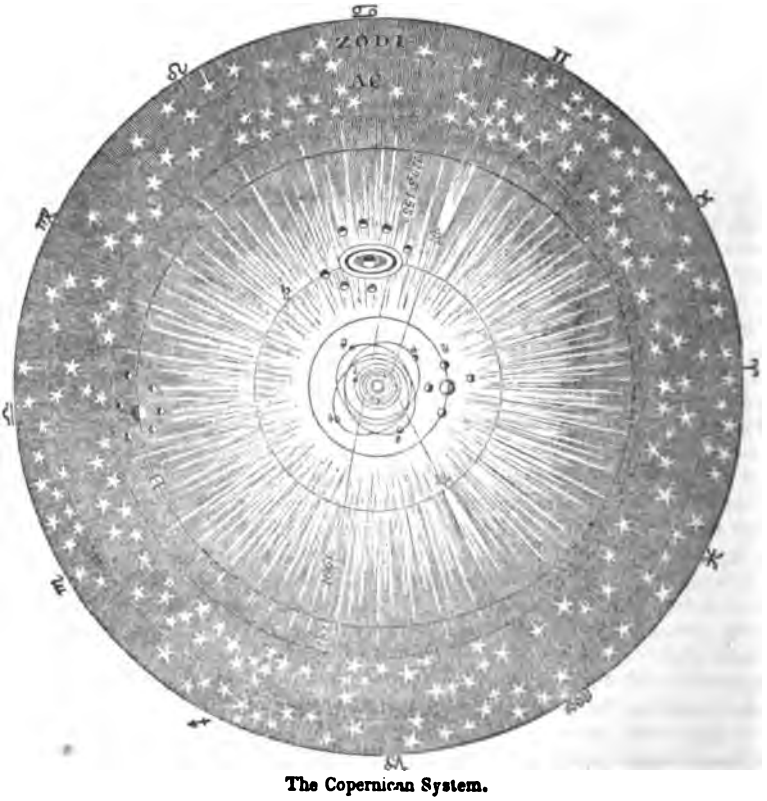
The moon always presents the same face to us; which proves that she revolves round her axis in the same time that she revolves round the earth. As the moon derives its light from the sun, and reflects a portion of it upon the earth, so the earth performs the same office to the moon. A spectator on the lunar surface would behold the earth like a luminous orb, suspended in the vault of heaven, presenting a surface about thirteen times larger than the moon does to us, and appearing sometimes gibbous, sometimes horned, and at other times with a round full face. The light which the earth reflects upon the dark side of the moon may be distinctly perceived by a common telescope, from three to six or eight days after the change. The lunar surface contains about sixteen millions of square miles, and is therefore capable of containing a population equal to that of our globe, allowing only about fifty-three inhabitants to every square

mile. That this planet is inhabited by sensitive and intelligent beings, there is every reason to conclude, from a consideration of the sublime scenery with which its surface is adorned, and of the general beneficence of the Creator, who appears to have left no portion of his material creation without animated existences; and it is highly probable that direct proofs of the moon's being inhabited may hereafter be obtained, when all the varieties on her surface shall have been more minutely explored.

THE COPERNICAN SYSTEM.

This system is called the True Solar System, and is now universally received among mathematicians and astronomers, and indeed very generally admitted by all to be not only the *true*, but also the most *ancient* system in the world, or of which we have any account; and is in truth more consistent, and even more conformable to natural appearances and the circumstances of the celestial motions, than any other hypothetical system of Astronomy that has ever been propagated among mankind.

This system was first of all, as far as the moderns have been able to ascertain, introduced into Greece and Italy, about 530 years before the commence-



The Copernican System.

[illegible] of the Christian era, by the great Pythagoras and his disciples, from whom it has been called the *Pythagorean System*.

The opinions of Pythagoras, though perhaps derived originally from some Eastern nation, were held by some of his pupils; but were either too contradictory, or not sufficiently obvious and clearly explained, or be maintained in continual succession, during a series of ages, emphatically styled the *dark ages*—a period of the most consummate ignorance and barbarism. The system of Pythagoras was, however, adopted and retained, until Plato, Aristotle, and the philosophers that came after them, embraced the vulgar idea, or what was afterward called the Ptolemaic system; and their authority imposed it upon mankind, till the doctrine which had been taught by Pythagoras more than 2000 years before, and which had been rejected and in a great measure become lost in nature, was revived about the year 1510, by the genius of Nicholas Copernicus, an eminent astronomer, born at Thorn, in Prussia, A. D. 1473; from whom it has been denominated the *Copernican System*. Copernicus having adopted and greatly improved the Pythagorean or true system of the universe, published it to the world with new demonstrative arguments in its favor, in his work entitled, *De Revolutionibus Orbium Cœlestium*, first printed at Nuremberg, in 1543, a little previous to his death, which took place in the same year, at the age of seventy. The truth of the ancient Pythagorean system, by applying mathematical reasoning to mechanical experiments, was afterward completely established by the incomparable *Sir Isaac Newton*.

VARIATIONS OF THE SEASONS.

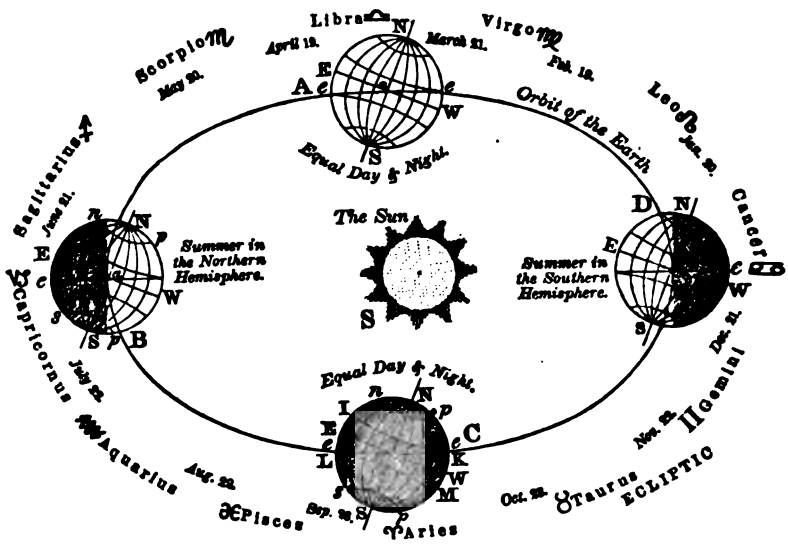
It is the inclination of the axis of the earth to the plane or level of its orbit, that occasions the variations of the seasons.

It is easy to be shown, that the alternate succession of day and night is produced by the rotation of the earth upon its axis; but the different lengths of days and nights in every part of the world, in the course of the year, and the phenomena of the different seasons, or the changes of heat and cold, summer and winter, spring and autumn, are occasioned by the annual revolution of the earth about the sun, in the plane of the ecliptic.

During one half of the year, the north pole is continually illuminated by the sun, and the south pole is all the time in darkness; and during the other half of the year, the south pole is constantly in the light, and the north pole is in darkness; and other parts in a proportional degree partake of this vicissitude, and occasion the variety of the seasons.

The difference in the degrees of heat, is chiefly owing to the different lengths which the sun attains above the horizon, and the different length of the days. In summer the sun appears nearest the zenith, and its rays falling nearly perpendicularly, more of them fall on any given portion of the earth's surface, and therefore produce a greater heat than in winter, when the sun is nearer the horizon, and its rays fall obliquely. When the days are long, and the nights short, the earth and air are more heated in the day than they are cooled in the night, and the reverse when the days are short and the nights long.

In the figure given above, let the inner circle, or rather *oval*, represent the orbit of the earth; S, the sun in the lower focus of the orbit; the four globes, N. E. S. W., the earth in different parts of its elliptic orbit, receiving from its changing position the varying seasons, and the succession and different lengths of day and night; N. S. the earth's axis; N. its north pole, S. its south pole, [illegible]. The spectator is here supposed to be beyond or without the orbit of the earth at a considerable distance, and to look upon it obliquely.



Variations of the Seasons.

As the earth revolves round the sun, according to the order of the letters, A B C D, &c., its axis N. S. keeps the same obliquity, or always preserves its parallelism, it being, in any one part of the orbit, in a position always very nearly parallel to that in which it was in any other part of its orbit, and its northern extremity always pointing *nearly* toward a fixed star situate immensely beyond the bounds of the solar system, and hence denominated the *North Polar Star*.

We shall now suppose the earth to set off from its position at the time of the vernal equinox, in the spring, and to revolve annually round the sun, S, from the point A, or that part of the orbit in which a spectator in the sun would see the earth coincide with the beginning of the sign *Libra*, of the ecliptic, and the inhabitants of the earth see the sun in the direction of *Aries*, or when the sun, as seen from the earth, appears to enter Aries. In this position of the earth, about the 20th of March, the axis, though inclined to the plain of the orbit, is not inclined toward the sun, the rays of which for a short time illuminate both hemispheres alike, from one pole to the other, causing an equal length of day and night in all parts of the world. At this time, which is called the *Vernal Equinox*, the rays of the sun fall perpendicularly on the terrestrial equator, and more or less obliquely on places more or less remote from the equator.

As the earth proceeds in its orbit, according to the order of the signs, and passes from *Libra* along the signs *Scorpio* and *Sagittarius*, to *Capricornus*, the sun is seen to advance from the west toward the east, along the signs *Aries*, *Taurus*, and *Gemini*, to *Cancer;* until in about three months, that is to say, on the 21st of June, the earth will arrive at the beginning of *Capricorn*, and the sun, as seen from the earth, will appear at the beginning of *Cancer*. Here the north pole, in consequence of the obliquity of the axis, becomes eventually so inclined toward the sun, that a considerable space round that pole becomes illu-

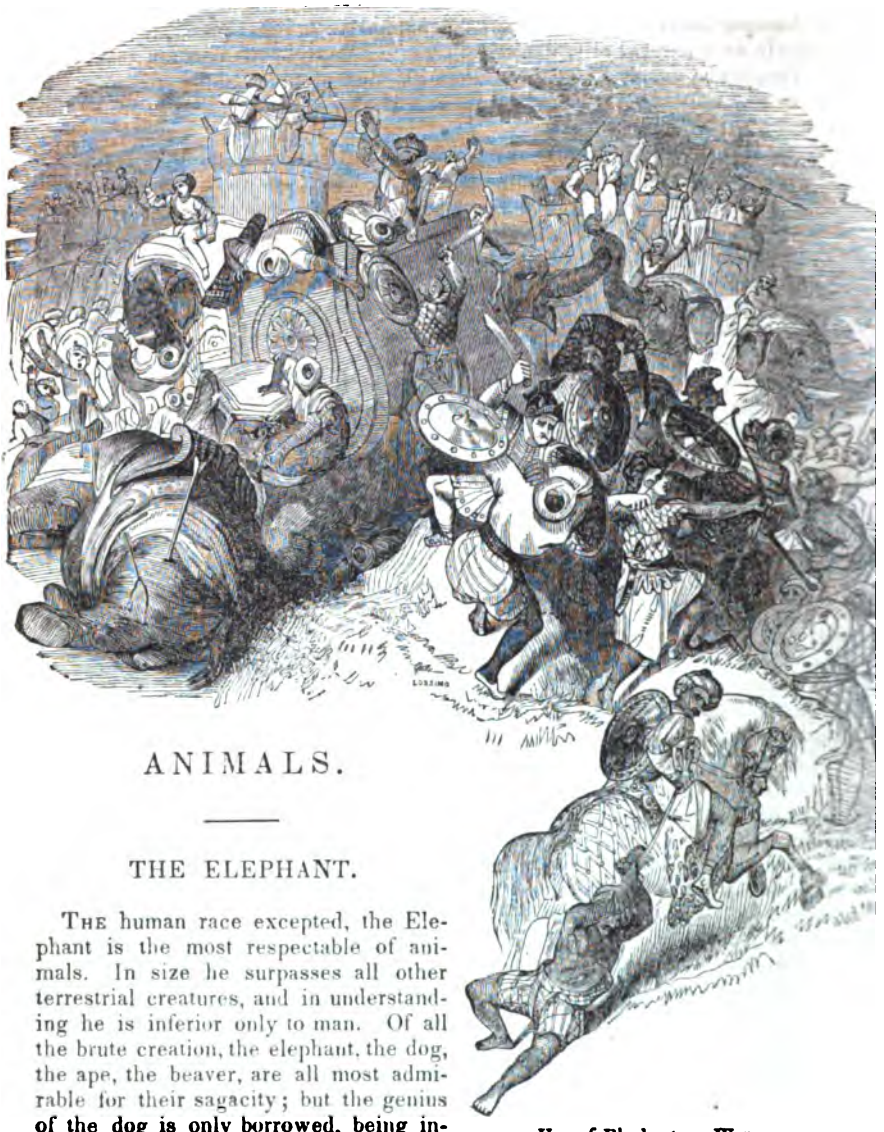
caused by the solar light, and an equal space round the south pole is in the dark, in consequence of being turned from the sun. At this time, which is *our Summer Solstice*, the solar rays fall obliquely on the equator, and perpendicularly on a parallel of latitude about 23° 28′ north of the equator, that is, on the Tropic of Cancer. The space then illuminated round the north pole, and that in obscurity about the south pole, extend also to the distance of about 23° 28′ from each pole.

After this the days begin to shorten in the northern parts of the world, and the nights lengthen, in proportion as the earth continues its course along the signs *Capricornus*, *Aquarius*, and *Pisces*, at the same time that the sun is seen to advance along the signs *Cancer*, *Leo*, and *Virgo*, the earth, in its annual revolution, advancing toward the first point of *Aries*, at which it arrives on the 23d of September, when the sun, as seen from the earth, appears at the beginning of *Libra*; and at this time, which is the *Autumnal Equinox*, the same conditions occur as when the earth is in the opposite part of its orbit, at the vernal equinox.

If we now follow the earth through the other half of its orbit, we shall find, that exactly the same effects take place in the southern hemisphere, while the earth is performing that half of its orbit, as what have been just remarked with respect to the northern hemisphere, while the earth was passing from A through B to C. When the earth arrives at D, about the 22d of December, the time of our *Winter Solstice*, the north pole is involved in obscurity, and a space round the south pole becomes enlightened to the distance of about 23° 28′ every way from that pole; and then the solar rays fall perpendicularly on the Tropic of Capricorn, the parallel of latitude 23° 28′ south of the equator.

Thus we see, that from *March* to *September*, or while the earth is moving from *Libra* through *Capricorn* to *Aries*, the north pole is inclined toward the sun, so that the rays of light fall most directly on the northern hemisphere, producing summer in the northern parts of the world; the north pole, remaining all the time in the illuminated hemisphere, will therefore have six months of continual day,—at the same time that the south pole is turned from the sun, which then shines very obliquely on all those parts of the southern hemisphere which are enlightened by the sun, thus producing winter in that hemisphere. But during that other half of the year, from *September* to *March*, while the earth is moving from *Aries* through *Cancer* to *Libra*, the north pole is turned from the sun, and therefore in darkness, while the south pole is presented more directly to the luminary; and the inhabitants of the southern hemisphere are cheered with summer, while those of the northern hemisphere are chilled with winter. Hence it is easy to perceive, that the inhabitants of the southern hemisphere have the same vicissitudes with those of the northern hemisphere, though not at the same time, it being winter in one hemisphere when it is summer in the other. In this way the two hemispheres always have opposite seasons at the same time.

The inclination of the earth's axis to the plane of the ecliptic, also causes a variation in the days and nights in different parts of the earth's surface, and in different seasons of the year; that at the equator the days and nights are equal, as they always are, and the sun rises and sets at *six o'clock* throughout the year; that, about the 20th of *March*, and the 23d of *September*, which are the periods of the equinoxes, the days are equal to the nights in all parts of the world; every part of the earth's surface coming into the light at six in the morning, and going into the dark at six in the evening.



Use of Elephants in War.

ANIMALS.

THE ELEPHANT.

THE human race excepted, the Elephant is the most respectable of animals. In size he surpasses all other terrestrial creatures, and in understanding he is inferior only to man. Of all the brute creation, the elephant, the dog, the ape, the beaver, are all most admirable for their sagacity; but the genius of the dog is only borrowed, being instructed by man in almost every thing he knows; the monkey has only the appearance of wisdom; and the beaver is only sensible with regard to himself, and those of his species. The Elephant is superior to them all three; he unites all their most eminent qualities. The hand is the principal organ of the monkey's dexterity; the Elephant with his trunk, which serves him instead of arms and hands, with which he can lift up and seize the smallest as well as the largest objects, carry them to his mouth,

place them on his back, hold them, or throw them far off, has the same dexterity as the monkey, and, at the same time, the trustfulness of the dog; he is, like him, susceptible of gratitude, capable of strong attachment; he uses himself to man without reluctance, and submits to him, not so much by force, as by good treatment; he serves him with zeal, intelligence, and fidelity; in fine, the elephant, like the beaver, forms the society of his equals, and makes them understand him. Elephants are often seen to assemble together, disperse, act in concert, and if they do not erect buildings, and do not work in common, it is perhaps for want of room only, and tranquillity; for men have very sensibly multiplied in all the regions inhabited by the elephant; he consequently lives in fear and anxiety, and is nowhere a peaceful possessor of a space large and secure enough to establish his habitation on a settled spot. Every being in nature has his real price, and relative value; to judge of both in the elephant, we must allow him at least the judgment of the beaver, the dexterity of the monkey, the sentiment of the dog, and, to add to these qualifications the peculiar advantages of strength, size, and longevity. We must not forget his arms, or his defence, with which he can pierce through and consume the lion. We must observe that he shakes the ground at every step; that with his trunk he roots up trees; that with the strength of his body he makes a breach in a wall; that, being terrible by his force, he is invincible by the resistance only of his enormous mass, and by the thickness of the leather which covers it; that he can carry on his back a tower armed in war, with a number of men; that he alone moves machines, and carries burdens which six horses cannot move. To this prodigious strength he joins courage, prudence, coolness, and exact obedience: he preserves moderation even in his most violent passion; he is more constant than impetuous in love; in anger he does not forget his friends; he never attacks any but those who have given him offence; he remembers favors as long as injuries: having no taste for flesh, and feeding chiefly upon vegetables, he is not naturally an enemy to other animals; he is beloved by them all, since all of them respect him, and have no cause to fear him. For these reasons, men have had at all times a veneration for this great, this first of animals. The ancients considered the elephant as a prodigy, a miracle of nature; they have much exaggerated his natural faculties; they attribute to him, without hesitation, not only intellectual qualities, but moral virtues.

In a wild state, the elephant is neither bloody nor ferocious; his manners are social; he seldom wanders alone; he commonly walks in company; the oldest leads the herd, the next in age drives them, and forms the rear; the young and the weak are in the middle. The females carry their young, and hold them close with their trunks. They only observe this order, however, in certain marches, when they go to feed on cultivated lands; they walk or travel with less precaution in forests and solitary places, but still keeping at such a moderate distance from each other as to be able to give mutual assistance and seasonable warnings of danger. Some, however, straggle, and remain behind the others; none but these are attacked by hunters, for a small army would be requisite to assail the whole herd, and they could not conquer without a great loss of men; it is even dangerous to do them the least injury; they go straight to the offender, and, notwithstanding the weight of their body, they walk so fast as that they easily overtake the lightest man in running; they pierce him through with their tusks, throw him against a stone, and tread him under their feet; but it is only when they have been provoked, that they become so furious and implacable. It is said that when they have been once attacked by men, or have fallen into a snare, they never forget it, and

seek for revenge on all occasions. As they have an exquisite sense of smelling, perhaps more perfect than any other animal, owing to the large extent of their nose, they smell a man at a great distance, and could easily follow him by the track. These animals are fond of the banks of rivers, deep valleys, shady places, and marshy grounds; they cannot subsist a long while without water, and they make it thick and muddy before they drink; they often fill their trunks with it, either to convey it to their mouth, or to cool their nose, and to amuse themselves in sprinkling it around them; they cannot support cold, and suffer equally from excessive heat, for, to avoid the burning rays of the sun, they penetrate into the thickest forests. They also bathe often in the water; the enormous size of their body is rather an advantage to them in swimming, and they do not swim so deep in the water as other animals; besides, the length of their trunk, which they erect, and through which they breathe, takes from them all fear of being drowned.

From time immemorial, the Indians made use of elephants in war. Amongst those nations unacquainted with the European military discipline, they were the best troop of their armies; and, as long as battles were decided by mere weapons, they commonly vanquished: yet we see in history, that the Greeks and Romans used themselves soon to those monsters of war; they opened their ranks to let them go through; they did not attempt to wound them, but threw all their darts against their leaders, who were forced to surrender, and to calm the elephants when separated from their troops; and now that fire has become the element of war, and the principal instrument of death, the elephants, who are afraid of the noise and the fire of the artillery, would be rather an incumbrance in battle, and more dangerous than useful.

In those regions, however, where our cannons and murdering arts are yet scarcely known, they fight still with elephants. At Cochin, and in the other parts of Malabar, they do not make use of horses, and all those who do not fight on foot, are mounted upon elephants. In Tonquin, Siam, and Pegu, the king and all the grandees never ride but upon elephants; on festival days they are preceded and followed by a great number of these animals richly caparisoned, and covered with the richest stuffs. On comparing the relations of travellers and historians, it appears that the elephants are more numerous in Africa than in Asia; they are there also less mistrustful, not so wild, and, as if they knew the unskilfulness and the little power of the men with whom they have to deal in this part of the world, come every day without fear to their habitations.

The engraving is from a work recently published in London, entitled, "Pen and Pencil Sketches of India," by Captain Mundy. The anecdote connected with the sketch furnishes an extraordinary instance of the sagacity of this most wonderful animal.

"By crack sportsmen, the lion is reputed to afford better sport than the tiger: his attack is more open and certain—a peculiarity arising either from the noble nature of the Jungle King, or from the country he haunts being less favorable for a retreat than the thick swampy morasses frequented by the tiger.

"A gentleman of our party had, perhaps, as perilous an adventure with one of these animals as any one; he having enjoyed the singular distinction of lying for some moments in the very clutches of the royal quadruped. Though I have heard him recount the incident more than once, and have myself sketched the scene, yet I am not sure that I relate it correctly. The main feature, however, of the anecdote, affording so striking an illustration of the sagacity of the elephant, may be strictly depended upon.

"A lion charged my hero's elephant, and he, having wounded him, was in

the act of leaning forward in order to fire another shot, when the front of the howdah suddenly gave way, and he was precipitated over the head of the elephant into the very jaws of the furious beast. The lion, though severely hurt, immediately seized him, and would doubtless shortly have put a fatal termination to the conflict, had not the elephant, urged by his mahout, or driver, stepped forward, though greatly alarmed, and grasping in her trunk the top of a young tree, bent it down across the loins of the lion, and thus forced the tortured animal to quit his hold! My friend's life was thus saved, but his arm was broken in two places, and he was severely clawed on the breast and shoulders." (See plate, p. 137.)

From amongst the numerous descriptions of tiger hunts, we select the following:—"At four, P. M., (so late an hour that few of us expected any sport,) Lord Combermere and nine others of our party mounted elephants, and taking twenty pad elephants to beat the covert, and carry the guides and the game, proceeded towards the swamp pointed out as the lurking-place of the buffalo-devouring monsters.

"The jungle was in no places very high, there being but few trees, and a fine thick covert of grass and rushes. Few of us, however, expecting to find a tiger, another man and myself dismounted from our elephants, to get a shot at a florikan, a bird of the bustard tribe, which we killed. It afterwards proved that there were two tigers within a hundred paces of the spot where we were walking. We beat for half an hour steadily in line, and I was just beginning to yawn in despair, when my elephant suddenly raised his trunk, and trumpeted several times, which my mahout (elephant driver) informed me was a sure sign that there was a tiger somewhere 'between the wind and our nobility.' The formidable line of thirty elephants, therefore, brought up their left shoulders, and beat slowly on to windward.

"We had gone about three hundred yards in this direction, and had entered a swampy part of the jungle, when the long wished for 'Tallyho!' saluted our ears, and a shot from Capt. M. confirmed the sporting *eureka!* The tiger answered the shot with a loud roar, and boldly charged the line of elephants. Then occurred the most ridiculous but most provoking scene possible. Every elephant except Lord Combermere's (which was a known stanch one) turned tail, in spite of all the blows and imprecations heartily bestowed upon them by the mahouts. One, less expeditious in his retreat than the others, was overtaken by the tiger, and severely torn in the hind leg; while another, even more alarmed, we could distinguish flying over the plain, till he quite sunk below the horizon. The tiger, in the mean while, advanced to attack his lordship's elephant, but being wounded in the loins by Capt. M.'s shot, failed in his spring, and sprang back among the rushes. My elephant was one of the first of the run-a-ways to return to action; and when I ran up alongside of Lord Combermere, (whose heroic animal had stood like a rock,) he was quite *hors du combat,* having fired all his broadside. I handed him a gun, and we poured a volley of four barrels upon the tiger, who, attempting again to charge, fell from weakness. Several shots more were expended upon him before he dropped dead; upon which we gave a hearty 'whoo! whoop!' and stowed him upon a pad elephant."

tiny it with such force, that he often seizes it at the first bound. If he misses the object and in two or three reiterated springs cannot reach his prey, he continues motionless for a time, seems to be very sensible of his disappointment, and waits for a more favorable opportunity. He devours a great deal at a time, and generally fills himself for two or three days to come. His teeth are so strong that he very easily breaks the bones, and swallows them with the rest of the body. It is reported that he sustains hunger a very long time; but thirst he cannot support in an equal degree; his temperament being extremely hot. He drinks as often as he meets with water, lapping like a dog. He generally requires about fifteen pounds of raw flesh in a day; and seldom devours the bodies of animals when they begin to putrefy; but he chooses rather to hunt for fresh spoil, than return to that which he had half devoured before. While young and active, the lion subsists on what he can obtain by the chase, and seldom quits his native deserts and forests; but when he becomes old, heavy, and less qualified for exercise, he approaches the habitations of men, to whom, and to domestic animals, he then becomes a more dangerous enemy. It is asserted, however, that when he sees men and animals together, it is always on the latter, never on the former, that he vents his fury; unless indeed he should be struck, and then, at no loss to know whence the blow came, he instantly deserts his prey, in order to obtain revenge for the injury. The flesh of the camel he is said to prefer to that of any other animal. He is likewise exceedingly fond of that of young elephants, which, from their inability to resist him till they have received the assistance of their mothers, he easily despatches, when unprotected by the dam; nor are there any animals able to oppose the lion, but the elephant, the rhinoceros, the tiger, and the hippopotamus.

THE TIGER.

(See page 142.)

In the class of carnivorous animals, the lion is the foremost. Immediately the lion follows the Tiger; which, while he possesses all the bad qualities of the former, seems to be a stranger to his good ones. To pride, to courage, to strength, the lion adds greatness, and sometimes, perhaps, clemency; while the tiger, without provocation, is fierce, without necessity, cruel. Thus it is throughout all the classes of nature, in which the superiority of rank proceeds from the superiority of strength. The first class, sole masters of all, are less tyrannical than the inferior classes, which, denied so full an exertion of authority, abuse the powers intrusted to them.

More, therefore, than even the lion, the tiger is an object of terror. He is the scourge of every country which he inhabits. Of the appearance of man, and of all his hostile weapons, he is fearless; wild animals as well as tame fall sacrifices before him; the young elephant and rhinoceros he sometimes attacks; and sometimes, with an increased audacity, he braves the lion himself.

The form of the body usually corresponds with the nature, the disposition of the animal. The tiger, with a body too long, with limbs too slim, with a head narrowed, and with eyes ghastly and haggard, has no characteristics but those of the basest and most insatiable cruelty. For instinct, he has nothing but a uniform rage, a blind fury; so blind indeed, so undistinguished, that he frequently devours his own progeny, and if she offers to defend them, tears in pieces the dam herself.

THE TIGER.

Happy is it for the rest of nature that this animal is not common, and that the species is chiefly confined to the warmest provinces of the East. The tiger is found in Malabar, in Siam, in Bengal, and in all the countries which are inhabited by the elephant and the rhinoceros.

When he has killed a large animal, such as a horse or a buffalo, he does not choose to devour it on the spot, fearing to be disturbed; and in order to feast at his ease, he carries off his prey to the forest, dragging it along with such ease that the swiftness of his motion seems scarcely retarded by the enormous load he sustains.

To give a still more complete idea of the strength of this terrible creature, we shall quote a passage from Father Tachard, who was an eye-witness of a combat of one tiger against two, and even three, elephants at Siam. For this purpose, the king ordered a lofty palisade to be built of bamboo cane, about a hundred feet square; and in the midst of this were three elephants appointed for combating the tiger. Their heads and part of their trunks were covered with a kind of armor like a mask, which defended that part from the assaults of the fierce animal with which they were to engage. As soon, says this author, as we were arrived at the place, a tiger was brought forth from his den, of a size much larger than we had ever seen before. He was not at first let loose, but held with cords, so that one of the elephants approaching gave him three or four blows with his trunk on the back with such force that the tiger was for some time stunned, and lay without motion, as if he had been dead. As soon, however, as he was let loose, and at full liberty, although the first blows had greatly abated his fury, he made at the elephant with a loud shriek, and aimed at seizing his trunk. But the elephant, wrinkling it up with great dexterity, received the tiger on his great teeth, and tossed him up into the air. This so discouraged the furious animal, that he no more ventured to approach the elephant, but made several circuits round the palisade, often attempting to fly at the spectators. Shortly after, a second and then a third elephant were sent against him, and they continued to strike him so terribly with their trunks, that he once more lay for dead; and they would certainly have killed him, had not a stop been put to the combat.

The hunting of the common tiger is a favorite sport in countries where they abound. We owe to the pen of Bishop Heber the following description of a scene, of which he was an eye-witness:—

"The young rajah, Gourman Singh, a border chieftain, whose father had been the sovereign of all Kemaoon, till driven to take shelter within the company's borders, having called to pay his respects to the bishop, during his stay at Kulleanpoor, mentioned that a tiger, in an adjoining wood, had done a good deal of mischief, and that it would be fine diversion for the bishop, and Mr. Boulderson, the collector of the district. The bishop assured him that he was no sportsman; but the collector's eyes sparkled at the name of a tiger, and he expressed great anxiety to go in search of him that very afternoon. The bishop, therefore, not liking to deprive him of his sport, went with the intention of being a mere spectator.

"The party set out on their elephants, with a servant behind each seat, or howdah, carrying a large hunting tiger, which, however, was almost needless. A number of people, on foot and horseback, attended from the bishop's camp, and neighboring villages; and the same sort of interest was excited as in England by a large hunting party. The rajah was seated in a low howdah, with two or three guns ranged beside him, ready for action; his elephant was the smallest of the party, hardly larger than a Durham ox, and almost as shaggy as a poodle; she was the native of a neighboring wood, where her race was

generally smaller than those of Bengal and Cittagong. Mr. Boulderson had also a formidable apparatus of muskets and fowling-pieces, projecting over his mohaut or driver's head. Thus equipped, they proceeded about two miles across a plain, covered with long jungle grass, from out of which quails and wild fowls rose in great numbers, and beautiful antelopes were seen scudding away in all directions.

"At length, the party came to a deeper and more marshy ground, and while Mr. Boulderson was doubting whether they should pass through, or skirt it round, some country people came running to say that the tiger had been tracked there this morning. They accordingly proceeded to the spot. It was a novel and stirring scene. The attendants were all eagerness and animation; they looked earnestly for every waving of the jungle grass, while the continual calling and shouting of both horse and foot excited an indescribable feeling of interest and surprise. The grass grew so wild, and rose so high, that it reached up to the howdah of the tallest elephant, and almost hid the Rajah's entirely. In the distance appeared what might have been taken for clouds, had not their base been stationary, and their outline so harsh and pyramidical,—the glorious range of the Himalaya mountains, the patriarchs of the continent, white and glistening as alabaster, and seen even at the distance of probably one hundred and fifty miles, towering above the nearest and secondary range, as much as these, which are said to be seven thousand six hundred feet high, lifted their giant buttresses above the plain on which the hunting party were assembled. It was impossible to gaze upon them without a feeling of delight and awe; but in a few moments the clouds closed round, as on the fairy castle of St. John, and left a cold gray horizon, encircling the green plain, and broken only by scattered tufts of peepul and mango trees.

"At last, the elephants all threw up their trunks into the air, and began to roar and to stamp violently with their fore feet; the rajah's little elephant turned

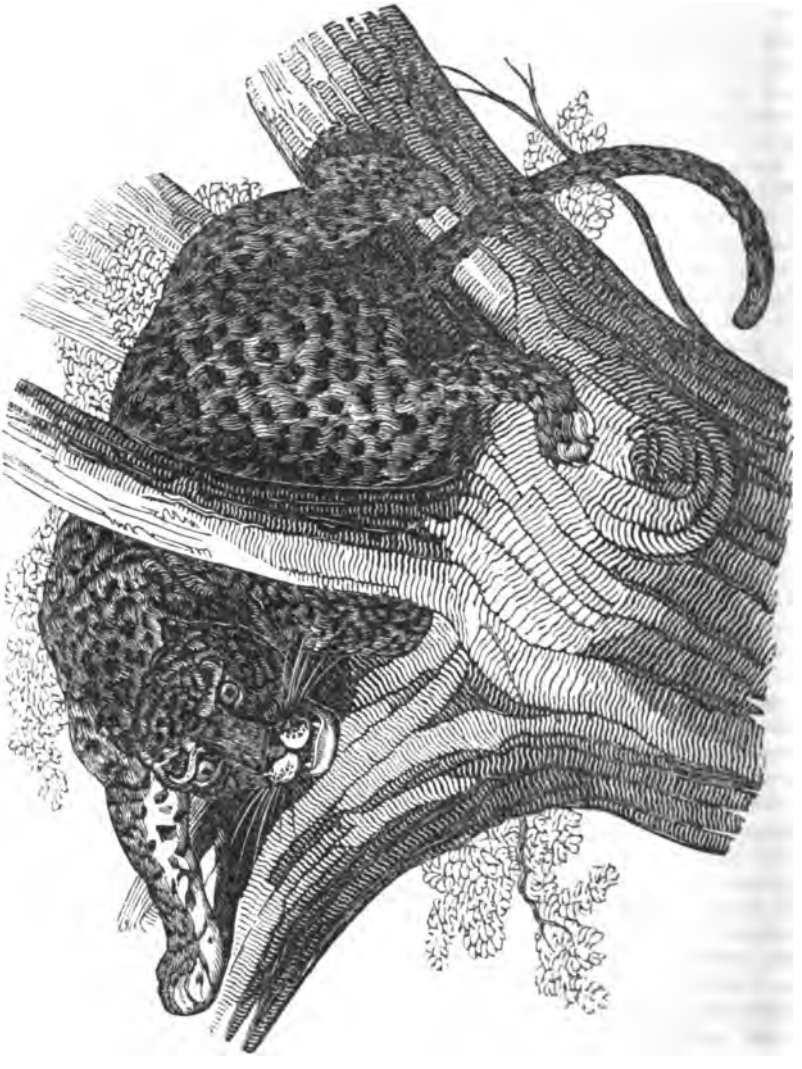
Tiger-hunting.

short mind, and, in spite of all her mohaut could say or do, she posted herself, in the rajah's great annoyance, close in the rear of the collector's. The other three, for one of the baggage elephants had some out, went on slowly, but boldly, with their trunks raised, their ears expanded, and their sagacious little eyes bent intently forward. 'We are close upon him,' said Mr. Boulderson; 'fire where you see the long grass shake, if he rises before you.' Just at that moment, the bishop's elephant stamped most violently. 'There, there!' cried the mohaut. I saw his head; a short roar, or rather a short growl, followed, and the motion of some animal was seen stealing away through the grass. I fired as directed," continued the bishop, "and a moment after, seeing the motion still more plainly, fired a second barrel. Another short growl followed, the motion quickened, and was soon lost in the more distant jungle. Mr. Boulderson said, 'I should not wonder if you had hit him that last time; at any rate, we shall drive him out of the cover, and then I will take care of him.' At that moment, the attendant crowd of horse and foot began to run off in all directions. We hastened to the place, but found that the alarm was a false one; in fact, we had seen all that we were in sea of the tiger, though we went twice more through the jungle. A large extent of high grass stretched out in one direction, but this we had not now sufficient daylight to explore. Whether the animal so near me was really a tiger," adds the narrator, "I have no evidence but its growl, the collector's opinion, the assertion of the mohaut, and the alarm expressed by the elephants."

THE LEOPARD.

[See page 146.]

THIS formidable and sanguinary animal is found nearly throughout the whole of Africa, and in eastern and southern Asia. He usually measures about three feet in length, exclusive of the tail, but sometimes reaches four feet. His appearance indicates his natural disposition. He has a restless eye and a sinister countenance, and all his motions are hasty and abrupt. In rapidity, agility, and precision of motion, he is unrivalled by any other animal—an advantage which he owes to the strength of his muscles, the suppleness of his joints, the extreme pliability of his spine, the greater lateral compression of his body, and the slender proportions of his limbs. His prey, on which he darts from his hiding-place, and even pursues up the trees, consists of antelopes, monkeys, and the smaller quadrupeds. Usually, he shuns man, but when closely pressed he turns upon the hunter, and hunger will drive him to attack, though by stealth, the human race. Even among the cats (says Mr. Bennett) he is remarkable for extreme sleekness and excessive agility. He is well distinguished from all the other species by the vividness of his coloring and the beauty of his markings. These consist of numerous rows of large rose-like spots passing along his sides, each formed of the confluence of several smaller black spots into an irregular circle enclosing a fawn-colored center upon a general ground color of light yellow. On his head, neck, and limbs, and the central line of his back, the spots run into one another so completely as to form full patches of smaller size than the open roses, and without central yellow. The under parts of his body, as is usual in most quadrupeds, become gradually of a lighter hue, the throat, chest, and abdomen being of a pure and delicate white. His tail is equal in length to the entire body, excluding the head, and is marked by a continuation of the open roses of the



THE LEOPARD.

tales, which become, towards its extremity, separated in such a manner as to surround the upper surface with partial rings of black, alternating with white. The whiskers are long and white, and implanted in a series of black lines which traverse his lips.

The leopard is often seen at night in the villages of the negroes on the west coast; and being considered a sacred animal, is never hunted, though women and children are not unfrequently destroyed by him. In the Cape Colony, where no such respect is paid him, he is shier and much more in eye of man. But though in South Africa he seldom or never ventures to attack mankind, except when driven to extremity, (unless it be some poor Hottentot child now and then that he finds unguarded,) yet, in remote places, his low, half-smothered growl is frequently heard at night, as he growls around the cottage or the kraal, as the writer of this article has a hundred times heard it. His purpose on such occasions is to break into the sheepfold, and at his purpose he not unfrequently succeeds, in spite of the troops of fierce watch-dogs, which every farmer keeps to protect his flocks.

The leopard, like the hyena, is often caught in traps constructed of large stones and timber, but upon the same principle as a common mouse-trap. When thus caught, he is usually baited with dogs, in order to train them to [illegible] with him, and seldom dies without killing one or two of his canine [illegible]. When hunted in the fields, he instinctively betakes himself to a tree, if one should be within reach. In this situation it is exceedingly perilous to approach within reach of his spring; but at the same time, from his [illegible] position, he becomes an easy prey to the shot of the huntsman.

The South African leopard, though far inferior to the lion or Bengal tiger in strength and intrepidity, and though [illegible] shuns a conflict with man, is nevertheless an exceedingly active and furious animal, and when driven to desperation, becomes a truly formidable antagonist. The Cape colonists relate many instances of frightful and sometimes fatal encounters between the hunted leopard and his pursuers. The following is a specimen of these adventures. It occurred in 1692, when the present writer was in the interior of the colony, and is here given as it was related to him by an individual who knew the parties engaged in it.

Two African farmers, returning from hunting the hartebeest, (*antilope bubalis*) roused a leopard in a mountain ravine, and immediately gave chase to him. The leopard at first endeavored to escape by clambering up a precipice; but being hotly pressed, and wounded by a musket-ball, he turned upon his pursuers with that frantic ferocity peculiar to this animal on such emergencies, and springing on the man who had fired at him, tore him from his horse to the ground, biting him at the same time on the shoulder, and tearing one of his cheeks severely with his claws. The other hunter, seeing the danger of his comrade, sprang from his horse and attempted to shoot the leopard through the head; but, whether owing to trepidation, or the fear of wounding his friend, or the quick motions of the animal, he unfortunately missed. The leopard, abandoning his prostrate enemy, darted with redoubled fury upon his second [illegible], and so fierce and sudden was his onset, that before the boor could [illegible] him with his hunting-knife, the savage beast struck him on the head with his claws, and actually tore the scalp over his eyes. In this frightful condition the hunter grappled with the leopard; and, struggling for life, they rolled together down a steep declivity. All this passed far more rapidly than it can be [illegible] in words. Before the man who had been first attacked could start to his feet and seize his gun, they were rolling one over the other down the bank.

In a minute or two he had reloaded his gun, and rushed forward to save the life of his friend. But it was too late. The leopard had seized the unfortunate man by the throat, and mangled him so dreadfully that death was inevitable; and his comrade (himself severely wounded) had only the melancholy satisfaction of completing the destruction of the savage beast, already exhausted with the loss of blood from several deep wounds by the desperate knife of the expiring huntsman.

THE PANTHER.

[See page 149.]

THIS animal resembles the tiger in its habits, and the leopard in its skin. Like the tiger, it has an insatiable thirst of blood, and an untameable ferocity; like the leopard, its skin is spotted, but is less beautiful than the skin of that animal. It seems, in truth, only a large variety of the leopard. The panther is usually more than six feet in length. In Africa, one was killed by Major Denham, which was more than eight feet in length. His hair is short, sleek, and mossy, and his color is in general of a bright tawny yellow, elegantly marked with black spots, disposed in circles of four or five each, with a single spot in the centre: his chest and belly are white. He has short and pointed ears, fierce and restless eyes, a strong harsh cry, and a savage aspect. So rapid are his movements that few animals can escape him, and such is his agility that he climbs trees in pursuit of his prey, and is sure of seizing his victim. The flesh of animals is said to be his favorite food; but when pressed by hunger, he makes his attacks without discrimination.

In the time of the Romans, panthers appear to have been very numerous, and at present the species is said to extend from Barbary to the remotest parts of Guinea.

The following narrative of an encounter with the panther, which is copied from the Library of Entertaining Knowledge, will abundantly prove the formidable nature of the panther, even when the animal is not of its largest size.

"I was at Jaffna, at the northern extremity of the island of Ceylon, in the beginning of the year 1819, (says the writer,) when, one morning, my servant called me an hour or two before my usual time, with 'Master, master! people sent me for master's dogs—tiger in the town!' Now, my dogs chanced to be some very degenerate specimens of a fine species, called the Poligar dog, which I should designate as a sort of wiry-haired greyhound, without scent. I kept them to hunt jackals; but tigers are very different things: by the way, there are no real tigers in Ceylon; but leopards and panthers are always called so, and by ourselves as well as the natives. This turned out to be a panther. My gun chanced not to be put together; and while my servants were doing it, the collector and two medical men, who had recently arrived, in consequence of the cholera morbus having just then reached Ceylon from the continent, came to my door, the former armed with a fowling-piece, and the two latter with remarkable blunt hog-spears. They insisted upon setting off without waiting for my gun, a proceeding not much to my taste.

"The tiger (I must continue to call him so) had taken refuge in a hut, the roof of which, as those of Ceylon huts in general, spread to the ground like an umbrella; the only aperture into it was a small door, about four feet high. The collector wanted to get the tiger out at once. I begged to wait for my gun; but no—the fowling-piece (loaded with ball, of course) and the two hog-

spears were quite enough. I got a hedge-stake, and awaited my fate, from very shame. At this moment, to my great delight, there arrived from the fort an English officer, two artillery-men, and a Malay captain; and a pretty figure we should have cut without them, as the event will show. I was now quite ready to attack, and my gun came a minute afterwards. The whole scene which follows took place within an enclosure about twenty feet square, formed on three sides by a strong fence of palmyra-leaves, and on the fourth by the hut. At the door of this, the two artillery-men planted themselves; and the Malay captain got at the top, to frighten the tiger out, by worrying it—an easy operation, as the huts there are covered with cocoa-nut leaves. One of the artillery-men wanted to go in to the tiger, but we would not suffer it. At last the beast sprang; this man received him on his bayonet, which he thrust apparently down his throat, firing his piece at the same moment. The bayonet broke off short, leaving less than three inches on the musket; the rest remained in the animal, but was invisible to us; the shot probably went through his cheek, for it certainly did not seriously injure him, as he instantly rose upon his legs, with a loud roar, and placed his paws upon the soldier's breast. At this moment, the animal appeared to me about to reach the centre of the man's face; but I had scarcely time to observe this, when the tiger, stooping his head, seized the soldier's arm in his mouth, turned him half round staggering, threw him over on his back, and fell upon him. Our dread now was, that if we fired upon the tiger, we might kill the man: for the moment there was a pause, when his comrade attacked the beast exactly in the same manner as the gallant fellow himself had done. He struck his bayonet into his head; the tiger rose at him—he fired; and this time the ball took effect, and in the head. The animal staggered backwards, and we all poured in our fire. He still kicked and writhed; when the gentlemen with the hog-spears advanced, and fixed him, while some natives finished him, by beating him on the head with hedge-stakes. The brave artillery-man was, after all, but slightly hurt: he claimed the skin, which was very cheerfully given to him. There was, however, a cry among the natives that the head should be cut off: it was; and, in so doing, *the knife came directly across the bayonet.* The animal measured scarcely less than four feet from the root of the tail to the muzzle. There was no tradition of a tiger having been in Jaffna before; indeed, this one must have either come a distance of almost twenty miles, or have swum across an arm of the sea nearly two in breadth; for Jaffna stands on a peninsula on which there is no jungle of any magnitude."

THE RHINOCEROS

[See page 151.]

After the elephant, the Rhinoceros is the most powerful of all quadrupeds. He is at least twelve feet in length, from the extremity of the snout to the tail; six or seven feet in height; and the circumference of his body is very nearly equal to his length; he is therefore like the elephant in bulk; and if he appears much smaller, it is because his legs are much shorter in proportion to those of the elephant; but he differs widely from that sagacious animal, in his natural faculties, and his intelligence; having received from nature merely what she grants in common to all animals; deprived of all feeling in the skin, having no organ answering the purpose of hands, nor distinct for the sense of feeling, he has nothing instead of a trunk but a moveable upper lip, in which centres all his dexterity. He is superior to other animals only in strength, size, and the

Vocabulary aids

offensive weapon which he carries upon his nose, and which is peculiar to him. This weapon is a very hard horn, solid throughout, and placed more advantageously than the horns of ruminating animals; these only protect the superior parts of the head and neck, while the horn of the rhinoceros defends all the exterior parts of the snout, and preserves the muzzle, the mouth, and the face from insult; so that the tiger attacks more readily the elephant, in seizing his trunk, than the rhinoceros, which he cannot attack in front without running the danger of being killed, for the body and limbs are covered with an impenetrable skin; and this animal fears neither the claws of the tiger nor the lion, nor even the fire and weapons of the huntsman; his skin is a dark leather, of the same color, but thicker and harder than that of the elephant; he does not feel the sting of flies; he cannot contract his skin; it is only folded by large wrinkles on the neck, the shoulders, and the buttocks, to facilitate the motions of the legs, which are massive and terminate in large feet, armed with three great claws. The skin of the two-horned rhinoceros is much more easily penetrable than that of the single-horned. He has the head larger in proportion than the elephant, but the eyes still smaller, which he never opens entirely, and they are so situated that the animal can see only what is in a direct line before him. The upper jaw projects above the lower, and the upper lip has a motion, and may be lengthened six or seven inches; it is terminated by a sharp edge, which enables this animal, with more facility than other quadrupeds, to gather branches and grass, and to divide them into handfuls, as the elephant does with his trunk. This muscular and flexible lip is a sort of trunk very incomplete, but which is equally calculated for strength and dexterity. Instead of those long ivory teeth which form the tusks of the elephant, the rhinoceros has his powerful horn, and two strong incisive teeth in each jaw. These incisive teeth, which the elephant has not, are placed at a great distance from each other in the jaws of the rhinoceros. He has, besides these, twenty-four smaller teeth, six on each side of each jaw. His ears are always erect; they are, for the form, like those of a hog, only they are larger in proportion to his body; they are the only hairy parts of it. The end of the tail is like that of the elephant, furnished with a tuft of large bristles, very hard and very solid. Huge and seemingly unwieldy as the rhinoceros is, he has the power of running with very great swiftness.

THE HIPPOPOTAMUS.

[See page 153.]

ALTHOUGH this animal has been celebrated from the earliest ages, it was, notwithstanding, but imperfectly known to the ancients. It was only towards the sixteenth century that we had some precise indications on the subject.

In comparing the descriptions which we have observed in different travellers, the hippopotamus appears to be an animal whose body is longer and thicker than that of the rhinoceros; but his fore legs are much shorter. His head is short, and thick in proportion to the body. He has no horns, either on the nose, like the rhinoceros, or on the head, like ruminating animals. His cry when hurt approaches as near to the neighing of the horse, as the bellowing of the buffalo; but his usual voice resembles the neighing of a horse, from which, however, he differs in every other respect; and this fact, we may presume, has been the sole reason for giving him the name of *Hippopotamus*, or *River Horse;* as the howling of the lynx, which resembles that of the wolf, has occasioned him to be called the *stag-like wolf*. The incisive teeth of the

Fig. — Asinælis.

hippopotamus, and especially the two canine teeth of the lower jaw, are very long, very strong, and of so hard a substance, that they strike fire with a piece of iron. This is probably what has given rise to the fable of the ancients, who have reported that the hippopotamus vomited fire. These canine teeth of this animal are of white, so clear and so hard that they are preferable to ivory for making artificial teeth. The incisive teeth of the hippopotamus, especially those of the lower jaw, are very long, cylindrical, and furrowed. The canine teeth, which are also very long, are crooked, prismatic, and sharp, like the tusks of a boar. The molares are square, or rather longer on one side than the other, nearly like the grinders of a man, and so thick, that a single one weighs more than three pounds. The largest of the incisive or the canine teeth are twelve, and even sixteen inches in length, and sometimes weigh twelve or thirteen pounds each. The skin is in some parts two inches thick; and the Africans cut it into whip-thongs, which, in consequence of their softness and pliability, they prefer to those procured from the rhinoceros hide.

The male hippopotamus is about six feet nine inches long, from the extremity of the muzzle to the beginning of the tail; fifteen feet in circumference, and six feet and a half in height. His legs are about two feet ten inches long; the length of the head three feet and a half, and eight feet and a half in circumference; and the width of the mouth two feet four inches. It however sometimes acquires much greater magnitude. In the south of Africa, M. le Vaillant killed one which measured ten feet seven inches in length, and about nine feet in circumference.

Thus powerfully armed, with a prodigious strength of body, he might render himself formidable to every animal; but he is naturally gentle, and appears never to be the aggressor, except when annoyed or wounded. It has been erroneously stated, that he commonly moves slowly on the land; on the contrary, when he has been injured, he has been known to pursue persons for several hours, who escaped with great difficulty. He swims quicker than he runs, pursues the fish, and makes them his prey. Three or four of them are often seen at the bottom of a river, near some cataract, forming a kind of line, and seizing upon such fish as are forced down by the violence of the stream. He delights much in the water, and stays there as willingly as upon land; notwithstanding which, he has no membranes between his toes, like the beaver and otter; and it is plain, that the great ease with which he swims, is only owing to the great capacity of his body, which only makes bulk for bulk, and is nearly of an equal weight with the water. Besides, he remains a long time under water, and walks at the bottom as well as he does in the open air. When he quits it to graze upon land, he eats sugar-canes, rushes, millet, rice, roots, &c., of which he consumes and destroys a great quantity, and does much injury to cultivated lands; but, as he is more timid upon earth than in the water, he is very easily driven away; and, as his legs are short, he cannot save himself well by flight, if he is far from any water. His resource, when he finds himself in danger, is to plunge himself into the water, and go a great distance before he reappears. He commonly retreats from his pursuers; but if he is wounded, he becomes irritated, and immediately facing about with great fury, rushes against the boats, seizes them with his teeth, often tears pieces out of them, and sometimes sinks them under water. "I have seen," says a traveller, "an hippopotamus open his mouth, fix one tooth on the side of a boat, and another to the second plank under the keel; that is, four feet distant from each other, pierce the side through and through, and in this manner sink the boat to the bottom. I have seen another, lying by the side of the sea-shore, upon which the waves had driven a shallop heavily laden, which remained upon his back dry, and which was again

washed back by another wave, without the animal appearing to have received the least injury. When the negroes go a-fishing in their canoes, and meet with an hippopotamus, they throw fish to him; and then he passes on, without disturbing their fishery any more. He injures none when he can rest himself upon the earth; but when he hides in the water, he was only him. Once, when our shallop was near shore, I saw one of them get underneath it, lift it above water upon his back, and overset it with six men who were in it; but fortunately they received no hurt."

"We dare not," says another traveller, "irritate the hippopotamus in the water, since an adventure happened which was near proving fatal to three men. They were come in a small canoe, to kill one in a river where there was but eight or ten feet of water. After they had discovered him walking at the bottom, according to his custom, they wounded him with a long lance, which so greatly enraged him, that he rose immediately to the surface of the water, regarded them with a terrible look, opened his mouth, and, at one bite, took a great piece out of the side of the canoe, and had very nearly overturned it; but he replunged almost directly to the bottom of the water."

These animals are only numerous in some parts of the world; it even appears that the species is confined to particular climates, and is seldom to be met with but in the rivers of Africa. Dutch travellers say that they bear three or four young ones; but this appears very suspicious; as the hippopotamus is of an enormous bulk, he is in the class of the elephant, the rhinoceros, the whale, and all other great animals, who bring forth but one; and this analogy appears more certain than all the instances that they have exhibited. The female brings forth her young upon land, and the calf, at the instant when it comes into the world, will fly to the water for shelter if pursued; a circumstance which Thunberg notices as a remarkable instance of pure instinct.

THE BUFFALO.

Although the buffalo is, at this present time, common in Greece, and tame in Italy, it was neither known by the Greeks nor Romans, for it never had a name in the language of these people. The word *buffalo* even indicates a strange origin, not to be derived either from the Greek or Latin tongues. In effect, this animal is originally a native of the hottest countries of Africa and India, and was not transported and naturalized in Italy till towards the seventh century. It is true, the ancients have spoken of an animal, as of a different species from the ox, under the name of *bubalus*, and Aristotle has mentioned the wild ox of Paeonia, which he has called *bonasus*. Both the ancients and moderns, however, have multiplied the species unnecessarily; and from strenuous observations, I am clearly of opinion that there are but two species which are essentially different, viz., the Ox and the Buffalo.

We may observe, throughout the different regions of the world, the breed of oxen differing from each other in all external appearances, according to the nature of the climate, or other circumstances; but the most remarkable difference is that which divides them into two classes, viz., the *Aurochs*, or ox without a bunch on its back, and the *Bison*, or bunched ox. From indubitable facts, however, we have the utmost reason to conclude, that these are no other than varieties of the same species. The bunch, the length and quality of the hair, and the form of the horns, are the sole characters by which the bison is distinguished from the aurochs; but the bunched oxen couple and produce with our oxen;

The Buffalo.

and we likewise know, that the length and quality of the hair in all animals depend on the nature of the climate; and that, in oxen, goats, and sheep, the form of the horns is various and fluctuating. These differences, therefore, do not suffice to establish two distinct species; and since our tame ox of Europe couples with the hunched ox of India, we have the greatest reason to think that it would also couple with the bison, or hunched ox of Europe. Notwithstanding this, however, we are not to be surprised, that the two kinds have not melted or coalesced into a mongrel breed, since many circumstances may have occurred to keep them asunder; and, in fact, we actually find that these kinds have subsisted till this present time, either in a free and wild, or in a tame state; and are scattered, or rather have been transported, into all the climates of the earth. All the tame oxen without hunches have proceeded from the aurochs, and all with hunches are issues of the bison.

THE BISON, OR GAYAL.

[See page 157.]

THE Gayal, *Bos gavæus*, has sometimes been considered as a bison; but it has few or none of the characters of the true bisons. These are light and agile animals for their size, and have great part of their power thrown into the neck. The gayal, on the other hand, is a heavy and clumsy animal; and the neck, especially the part of it next the head, is small and feeble. The only character which it has in common with the bisons, other than those which belong to the whole genus *bos*, is that of fourteen pairs of ribs; and although our domestic oxen, and the varieties of other countries which most resemble them, have only thirteen pairs, yet fourteen is not a constant, and therefore cannot be regarded as properly a typical character of the bisons. The eastern one has fourteen, but the American has fifteen.

The full-grown male of the gayal is nine feet and a half long, and exactly half as much in height. The body is rounded and rather clumsy in appearance; and both the middle of the back and the setting of the neck are depressed, which give a hump-like appearance to the interscapular portion of the ridge; but there is no true hump; yet, in consequence of this ridgy appearance, the animal stands four or five inches higher on the fore-legs than at the crupper, and the hinder part of that curves downward to the tail, which is slender and not very long.

The front is square, broad, and flat, the insertions of the horns being ten inches apart. The horns curve slightly outward and upward, while the ears, which are nearly of the same length as the horns, and slender in proportion to their length, droop down till their direction is nearly the reverse of that of the horns. The eyes are rather small in proportion to the size of the animal. Both sexes have a small tuft of white curled hair between the bases of the horns, which curls down upon the forehead. The dewlap is large and pendulous, and makes the portion of the neck next the head appear more feeble than it really is; it also gives an apparent depth to the chest, out of all proportion to its width. The abdomen is large, but contracts towards the groin, as if the body were slightly compressed by a girdle there. The udder of the female is small. The legs are thick and stout; the principal hoofs broad, and the false ones much larger in proportion than those of the domestic ox. The hair is very short, with the exception of that on the forehead, already mentioned, and a small bunch on the end of the tail. The color is brown in various shades. The characters and also the habits of this animal resemble the ox more than they do the buffalo; but it breeds indiscriminately with either.

THE YAK.

THE Yak, *Bos grunniens* of Pallas, is not very accurately named by that naturalist, as its voice is a sort of subdued and broken low, rather than a grunt. This is the mountaineer of Central Asia, being found in the Himalaya and Altai ridges, and in the connecting ones, and their spurs eastward as far as China. It has been classed with the bisons, and in the northern extreme of its geographical range, it is understood to trench closely upon the habits of the eastern one; but it is an animal domesticated to a very considerable extent; and its characters are more peculiar than those of many others of the genus. It has

The Yak.

the same number of ribs as the bison, and the forehead is a very little arched; but the resemblance between them extends little further.

In the more elevated portions, it is rather a small animal, not above three feet and a half in height at the shoulder, and seven feet in length; but in its more fertile pastures it attains a larger size. In the form of its head there is a slight resemblance to the buffaloes; but the character of the horns is more like that of the ox. They are lateral in their insertion, and do not advance toward each other on the frontal ridge, as in these animals. One of the most peculiar parts of it is the tail, which is covered all over with long hair like that of the bison, only the texture of the hair is much finer. Their tails are in much request both in India and the Turkish empire. In the former they are used for covering all the lines, and among the Turks they are used as insignia of rank. They take a fine dye; the stumps are often richly and beautifully ornamented, and they have a very flowing and graceful appearance. When a bashaw of so many tails is mentioned, it means the number of the tails of the yak which he is allowed to have carried when he rides in state.

THE BRAHMINY BULL.

The general shape of the Brahminy Bull, which is the sacred bull in most parts of India, and especially in the valley of the Ganges, may be understood from the figure. In Benares, and those other cities which are crowded with the more wealthy and devout Hindoos of high caste, these animals are exceedingly numerous, thronging the streets, and the courts and areas of the temples. They are fed to the utmost profusion, and they are very fat, indolent, and inoffensive. When left without these attentions, they are smaller and much more active; but they have been so long domesticated, or rather under the protection of the people, that there are many varieties in appearance. When they are

The Brahminy Bull.

fat, the hump on the shoulders and the dewlap are very much produced, and in all conditions they have the skin of the neck furrowed with transverse wrinkles. Their general color is dun, passing into blackish on the upper part, and whitish on the under. There are many varieties of these hunch-backed ones in India, but it is not easy to say which is the original race, or whether those which are found wild be in a state of nature, or have been left in the changes of society which the country has undergone. These humped oxen have the voice less deep than the others, and the form of the hind quarters and the insertion of the tail are different from the European varieties.

THE GIRAFFE.

The height of a full-grown giraffe varies from eighteen to twenty feet, although some specimens, in their natural state, have been seen exceeding this by several inches. One half of this elevation consists of the neck, from the ears to its junction with the projecting angle of the chest; and the other half consists of the fore legs, ascending to the same point. Casual observers are apt to suppose that the fore legs of the giraffe are very disproportionably longer than its hind legs; yet they are in reality of equal length—the apparent difference arising from the height of the shoulder, or rather, perhaps, from the great length of the spinous processes of the scapular vertebræ, which descend in an angle of inclination nearly equal to the back of a stag thrown upon its haunches or rising from its lair. And this effect is so much enhanced by the dorsal protuberance above the shoulder, that few persons are undeceived but by deliberate inspection. The front view of this singular animal is unique and

The Giraffe.

rather unavoidably grotesque. Its neck appears too thin, mounting lankly aloft, as it does, from a capacious orbicular duo-convex chest—like a tall iron crane from the box of its windlass. And the *tout ensemble* of this, in connexion with the very long, thin legs, which perpendicularly sustain so odd a superstructure, is not unlike the front aspect of a real ornithological crane, as it sometimes stands forlorn on the margin of a pool, innocent of eels, and bolt upright in its attentive meditations. Yet no animal exhibits a more gracefully majestic attitude and richly flowing outline than this otherwise uncouth giraffe, when beheld in its side view, cropping the topmost leaves of high branches, or lifting its airy, vivacious head, attentive to distant sounds. Its aspect is then a charm to the eye of taste, and excites the admiration of the most indifferent spectator.

It differs from all other animals in the singular structure of those cylindrical prominences which grow upon its frontal bone, and which are, in fact, cellular enlargements of that bone, of nearly equal size unto their abrupt extremities, which are surmounted by tufts of short bristly hairs. These singular appendages are not peculiar to either sex, and, being of the same substance as the rest, of course are never shed; although, in the young specimens, they are united in the scull by a distinct suture. They are not horns, nor used as such, either to attack or defence; but, as though this creature were designed to be in every similar and dissimilar to every other, it has a third prominence, or budding horn, broader, but not nearly so projecting as the others, articulated on the forehead, midway between them—as though its owner had some slight notion of becoming a unicorn. Besides these, it has two bony tubercles, or rudiments

of horns, on each side of the main, on the occiput. The shape of the ears is peculiarly beautiful—and they are moved with brisk and spirited expression toward sounds often unheard or unheeded by the spectators whose attention has been attracted to the movement. The eyes of the giraffe are singularly large, full, and clear, soft and rich as the famed gazelle's, and fringed with very long lashes. They are situated so prominently on the sides of the head, as to excel, in advantage of position, those of the hare; and it is supposed that the giraffe can command a wider view of the horizon than any other creature. The surface of its skin is smooth, the hair being short, close, and flatly laid. The ground color is a dull white, warming to a rich cream tint, and deepening with age to a very faintly-red brown. The spots are of a much darker brown, and of so generally regular a form and arrangement as to give the hide the appearance of being cross-barred with whitish stripes. When young, the sexes are scarcely distinguishable by their color; but, as they advance in age, the male becomes of a darker brown, and the lighter stripes are somewhat less clear; but the female retains more of her original rust-colored hue, and may be known by this contrasted tint. There is, however, some very slight variation of color in specimens of the same age, and in the same individuals at different seasons of the year.

Another singularity in the giraffe is, that it has neither a muzzle nor lachrymal sinuses. It has no incisors in the upper jaw, but twelve grinders: in the lower jaw it has twelve grinders and eight incisors. The female has four mammæ, situated in the groin, and she gestates twelve months with foal. But the most instructive singularity in the physiology of the giraffe, and the one which, above all others, determines its geographical insulation and scarcity, is the remarkable adaptation of its tongue to the food which it chiefly prefers and seeks. This coincidence seems to have escaped the attention of naturalists, and was, perhaps, first observed by Mr. Clayton, the intelligent gentleman who captured the giraffes now in this country. The organ, in these specimens, is about thirty inches in length, tapering nearly to a sharp point, and endowed with greater contractility, extensibleness, and flexibility, than the tongue of any creature but the ant-eater. It is coated on the upper surface, and round its point, with a skin so hard and impervious, that it cannot be cut or pierced even with a sharp knife, without great pressure. The food on which the giraffe principally subsists, in its natural state, is the foliage and juicy branches of a species of the *mimosa* or acacia, called by the natives *kameel-doorn*, which is said to be peculiar to the valleys in which the animal is only known to have been seen, and to constitute their almost exclusive vegetation. This variety of the acacia abounds with very long and exceedingly sharp spines, whose puncture is as subtile as that of a needle. Yet, protected by its wonderfully impermeable covering, the flexile tongue of the giraffe securely threads its way through the foliaged danger, winds around the branches amid the spines, culling each particular leaf with more than manual dexterity, and incurring neither puncture nor laceration.

THE WOLF.

The essential characteristics of the common Wolf may be thus described:—the tail straight; the hide of a grayish yellow, with a black oblique stripe on the fore-legs of those which are full grown, and the eyes oblique The ancients had an opinion that the neck of the wolf was all of one solid bone; but we

PORTRAIT OF THE WOLF

The Wolf.

need not say that this is one of the many opinions by which their ignorance on points of very common knowledge is demonstrated. The average height of the wolf is about two feet six inches before, and two feet four inches behind; and the length of the body, from the tip of the muzzle to the beginning of the tail, three feet eight inches. The cubs of the wolf are born with the eyes shut; the female goes with young sixty-three days; in these respects exactly resembling the dog. The average duration of their life is from fifteen to twenty years.

The great resemblance between the wolf and the dog has been frequently remarked; and some naturalists consider them of the same species. The polar voyagers state, that they had often much difficulty to distinguish the dogs of the Esquimaux from the wolves; and yet, notwithstanding this external resemblance, there is a very essential difference in their characters, and the dog and the wolf are, in all circumstances, the natural foes of each other. Captain Parry, in the Journal of his Second Voyage, says: "A flock of thirteen wolves, the first yet seen, crossed the ice in the bay from the direction of the huts, and passed near the ships. They so much resemble the Esquimaux dogs, that, had it not been for some doubts among the officers who had seen them, whether they were so or not, and the consequent fear of doing these poor people an irreparable injury, we might have killed most of them the same evening, for they came boldly to look for food within a few yards of the Fury, and remained there for some time." Again, he says in his Journal, a few days after: "These animals were so hungry and fearless as to take away some of the Esquimaux dogs in a snow-house near the Hecla's stern, though the men were at the time within a few yards of them." These dogs set up a fearful howl at the approach of a wolf; and, in speaking of the resemblance between the two, it should be mentioned that wolves have not the bark of a dog, but only a howl; and, as the

Esquimaux dog also does not bark, this, and the other circumstances of close resemblance, have led to the conclusion that this animal is no other than a domesticated wolf.

Wolves are cruel and cowardly animals, with a peculiarly sinister expression of countenance. They fly from man, except when impelled by extreme hunger, when they prowl by night in great droves through villages, and destroy any persons they meet. It is said of them, as of several other beasts of prey, that when they have once obtained the taste of human blood, they give it the preference to any other. Very fearful accounts are on record of the ravages committed by wolves, when in hard weather they associate in immense flocks. So lately as 1760, such terror is said to have been excited in France by the ravages of wolves, that public prayers were offered for their destruction. The following statement from Captain Franklin shows the extreme cunning of the wolves in the pursuit of a creature of superior speed:—"We passed the remains of long red-deer, lying at the bases of perpendicular cliffs, from the summits of which they had probably been forced by wolves. These voracious animals, which are inferior in speed to the moose or red-deer, are said frequently to have recourse to this expedient, in places where extensive plains are bounded by precipitous cliffs. While the deer are quietly grazing, the wolves assemble in great numbers; and, forming a crescent, creep slowly towards the herd, so as not to alarm them much at first; but when they perceive that they have fairly hemmed in the unsuspecting creatures, and cut off their retreat across the plain, they move more quickly, and with hideous yells terrify their prey, and urge them in flight by the only open way, which is towards the precipice; appearing to know that, when the herd is once at full speed, it is easily driven over the cliff—the rearmost urging on those that are before. The wolves then descend at their leisure and feast on the mangled carcasses."

THE CACHEMIRE GOAT.

[See page 186.]

The following representation of the Cachemire Goat is taken from the fine work of F. Cuvier and G. St. Hilaire, on Mammiferous Animals. The specimen, in the Jardin des Plantes at Paris, of which that work contains a portrait, was sent from Calcutta, having been obtained from the menagerie of the governor-general of India, where it was born of a couple that came direct from Cachemire to Bengal. The wool of this goat appears, by a scrupulous comparison, to be quite as delicate as the finest brought from Thibet. Cachemire, however, contains several breeds of goats with fine wool; and a specimen was recently seen in England, which differed from that in France by having longer ears, for they all yield, apparently, the same produce; for the fineness of the wool is determined by the influence of the climate.

There are two sorts of hair which nature seems to have furnished, more or less in every quadruped: the one, fine, curly, generally grey, and imparting to the skin a down more or less thick, as if to guard it against cold and damp; the other, coarse, flat, giving a general color to the animal, and appearing in numerous instances to be an organ of sensation.

These two sorts of hair generally become thicker, according to the degree of cold to which they are exposed; and the frizzled hair becomes gradually finer as the cold increases in dryness. It is this frizzled hair of the Cachemire goat which renders these animals so valuable; for to this we owe those deli-

rate shawls which are so deservedly esteemed for a variety of qualities found in no other article of clothing.

The French have attempted to introduce this breed of goats into their own country; but the success of the experiment seems somewhat doubtful. It is, however, singular, as observed by Messrs. Cuvier and Hilaire, that no European has yet availed himself of the wool produced by most of our domestic goats, which, though less delicate than the Thibet, would undoubtedly have yielded a web far more fine and even than the most admired merino sheep.

The male goat, in the menagerie of the Jardin des Plantes, is admired for his symmetry, his graceful motion, and his quiet temper. But he has a much greater distinction—he is free from smell; whereas nearly all European goats are known to emit a strong unpleasant odor. The Cachemire goat is of middle size, two feet high at the neck joint, and two feet ten inches from the point to the root of the tail; his head from the snout between the horns is nine inches, and his tail five. His horns are erect and spiral, diverging off toward the pointed. His silky hair is long, flat, and fine, instead of gathering up in [illegible] like that of the Angora goats. It is black about the head and neck, and white about the other parts of the body. The woolly hair is always of a pearl white, whatever be the color of the rest.

THE GNU.

(See page 166.)

The Gnu is found in small herds, on the vast plains of Southern Africa, where, in the midst of a world of antelopes, he spends his time in grazing the long grass and succulent vegetation of those regions. He is considered by zoologists to be a species of *antelope*, in which he bears an unquestionable relation, in the structure of his horns, the general form of his body, &c.; but he nevertheless possesses, as we shall presently see, so many distinguishing characteristics of his own, that he deserves to be separated from the immense family with which he is at present associated, and made to stand as the representative of a new *genus*. There are three species of the gnu: 1, the one under consideration; 2, the *kokoon*, (*A. laurum*, BURCHELL,) of a larger size than the gnu, but similar to it in form, and although inhabiting the same localities, never associating with it; and 3, the *brindled gnu*, (*A. garon*, HAMILTON SMITH,) a very distinct species from either of the preceding, but known only by a stuffed specimen in the museum of the London missionary society, which was brought from the countries near the source of the Orange river.

Gnus are distinguished chiefly by their horns, which are possessed by both sexes; and also by the singular form of the muzzle, which differs from that of all the antelopes, and closely resembles the snout, nostrils, and lips of an ox. The horns arise by two broad bases, which spread over and cover the forehead in precisely the same way as in the musk-ox; this solid helmet is then drawn out on either side into two strong smooth black horns, which, bending downward and forward, become quite round, and then turning to a height equal to their descent, terminate in a blunt hard point.

The nostrils are large, and covered by a fold of the skin, which being under the command of the animal, answers all the purposes of a valve, to defend the olfactory organs against the ingress of those particles of dust, which the slightest atmospheric disturbance wafts in clouds from the shifting surface of the desert. The females have two mammæ, in which they differ from many of the

GNUS FIGHTING.

antelopes, which have four. The neck is decorated with a fine flowing mane, and the throat with a stiff-haired beard. A small dewlap hangs from the breast; and the tail is loose and hairy, as in the horse.

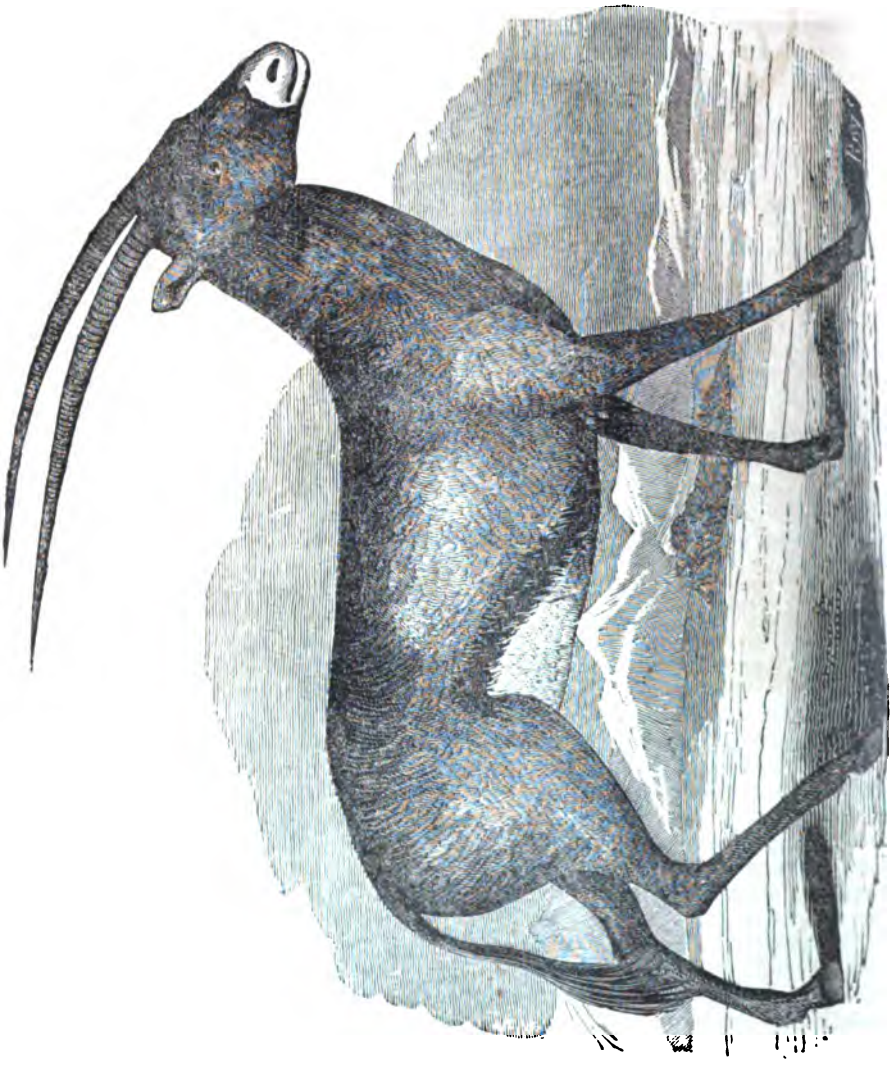
In the species which we have figured, the common gnu, the characters which we have thus described, as belonging equally to himself and his congeners, are modified, and the species is distinguished by the following peculiarities: the fur is soft, and of a rich brown; the tail reaches to the hoof joint, brown above, and white beneath; the neck, with a plentiful black mane; and the forehead, with a tuft of hair on its centre; the feet and legs neatly formed, and of great elasticity. The hind quarter, for lightness, strength, and beauty of outline, is unequalled in the animal kingdom. They are about the size of a full grown ass, and said, by travellers, so closely to resemble a small horse, both in pace and form, that when seen at a distance, flying over the plains of South Africa, they might be readily mistaken for a troop of the wild zebras and quaggas, which inhabit the same localities, if their dark and uniform color, and the circumstance of their always running in lines, one behind the other, did not distinguish them.

THE GEMS-BOK.

(See page 178.)

THE genus Bubor is, in all probability, the oryx of the ancients, and may (indeed must) in their days have been much more widely distributed than it is now. It is said still to exist, not only in that part of Africa which lies opposite the south of Arabia, but in the latter country, and in Persia, as far as the Indies, being, in all its localities, the southern neighbor of the gazelle and its varieties. The data are not complete enough for certainty; but this is probable, as the *isothermal* line does *tend* in that direction; and it is all, partially at least, within the action of the rains. In former times it must, from the extent of plain which has been converted into desert, have extended much farther, and it is not possible to suppose that any one acquainted with Egypt could have been ignorant of it. It is a gregarious animal, and an inhabitant of the plains; but it browses on the leaves of trees, principally those of the acacias, and not the saline plants, like the gazelle; and therefore when, in its progress toward the desert, the country came to produce only gazelle's food, the abu-harb (the oryx) must have deserted or perished. As its general habits resemble those of the gazelle, it is highly probable that there are, as in that animal, many climatal varieties; and that what have been sometimes described as different species are the same. It must not be forgotten that, as the progress of cultivation has broken the domesticated ruminantia of Europe into many varieties, the progress toward desolation has done the same with the wild ruminantia of the districts under notice.

This species is rather stout in the body. Its general color is white, variously marked with black on the forehead and brush in which the tail terminates, with brown on the legs, and with rust-color between the brown and white. The horns are long, slender, and very slightly bent from the curve of the forehead throughout their length. This is the animal, the profile of which, with the horns seen as one, is supposed to have suggested the notion of the fabled unicorn; and the robust make, the long tail with a brush, the mane, though that is much exaggerated, and all the characters of the animal, give some probability to a conjecture which can neither be established nor refuted.



THE GEMS-BOK.

CEYLON ELK.

Of the animals known in the island of Ceylon, the principal is the elephant, which is found in large herds, and is an object of very profitable traffic. The Ceylon elephant is particularly valued, and always fetches a high price. The next most remarkable animal, in the Elk, of which there is a species, it is imagined, peculiar to this island. It differs from the common elk, in having a short dark mane, that covers the neck and throat. When full grown, it measures about five feet from the extremity of the fore hoof to the top of the shoulder. Its color is dark brown, except on the neck, belly, and hind part of the thighs, where it approaches nearly to black. The habits of this animal are gregarious, though it is occasionally met with alone in the woods. Its appearance betokens gentleness, and even timidity, but it is, nevertheless, very tenacious of a stranger's approach; and at a particular season it is extremely dangerous to go near it. It is very difficult to tame, for though playful and harmless while young, as soon as it begins to have a consciousness of its power, it becomes wild, and so impatient of restraint, that it cannot be reconciled even in its keeper. The female precisely resembles the male, except that it is smaller and has no horns.

Buffaloes are common in Ceylon, and the white buffalo is sometimes found;

but these are very rare, and have a sickly appearance. It is therefore probable, as many of the natives suppose, that the whiteness is occasioned by some disorder, similar to that kind of leprosy in the blacks, which turns their skin to a dull sickly white.

THE ZEBRA.

The Zebra is the handsomest and most elegantly clothed of all quadrupeds. He has the shape and graces of the horse, the swiftness of the stag, and a striped robe of black and white alternately disposed with so much regularity and symmetry, that it seems as if nature had made use of the rule and compass to paint it. These alternate bands of black and white are so much the more singular, as they are straight, parallel, and very exactly divided, like a striped stuff, and in other parts extend themselves not only over the body, but over the head, the thighs, the legs, and even the ears and the tail; so that, at a distance, this animal appears as if he was surrounded with little fillets, which some person had disposed in a regular manner, over every part of the body. In the females, these bands are alternately black and white; in the male, they are brown and yellow, but always of a lively and brilliant mixture, upon a short, fine, and thick hair; the lustre of which still more increases the beauty of the colors. The zebra is, in general, less than the horse, and larger than the ass; and, although it has often been compared to those two animals, and called the *Wild Horse*, and the *Striped Ass*, it is a copy neither of the one nor the other, and might rather be called their model, if all was not equally original in nature, and if every species had not an equal right to creation.

The zebra is chiefly found in the southern parts of Africa; often seen near the Cape of Good Hope; and a penalty of fifty-six dollars is inflicted on any person who shoots one of them. Such of them as are caught alive are presented to the governor. Several have been brought to England, but, except in one instance, they have all displayed great wildness, and even ferocity. The exception was in that which was burnt some years ago at Exeter 'Change. It would allow young children to be put upon its back, and was once ridden from the Lyceum to Pimlico; but it was bred and reared in Portugal, from parents half reclaimed. In several other cases zebras have attempted to injure spectators, and have not even spared their keepers. The voice of this creature is thought to have a distant resemblance to the sound of a post horn.

The zebra which we have just described is confined to the mountains; the subject of the accompanying cut inhabits the flat parts near the Cape. Till very recently, the difference between them was not accurately understood. "The ground color of its whole body (says Mr. Bennett) is white, interrupted by a regular series of broad black stripes extending from the back across the sides, with narrower and fainter ones intervening between each. Over the haunches and shoulders these stripes form a kind of bifurcation, between the divisions of which there are a few transverse lines of the same color: but these suddenly and abruptly cease, and are not continued on the legs, which are perfectly white. Along the back there is a narrow longitudinal line, bordered on each side with white. The mane is throughout broadly and deeply tipped with black, and is marked by a continuation of the transverse bands of the neck. The lines of the face are narrow and beautifully regular; from the centre of the forehead they radiate downward over the eyes; along the front of the muzzle they are longitudinal, the outer ones having a curve outward; and on the sides

The Zebra of the Plains.

they form broader transverse bands. From the confluence of these bands, on the extremity of the muzzle, the nose, and the lower lip, these parts become of a nearly uniform blackish brown. The tail is white; there is no longitudinal central line; and a large black patch occupies the posterior part of the ear, near the tip. The hoofs are moderately large, deep in front, shallow behind, and much expanded at their margin."

THE WILD BOAR.

[See page 164.]

The Boar generally lives to twenty-five or thirty years, if he escapes accidents. They feed on all sorts of fruits, and on the roots of many plants; the roots of fern in particular seem a great favorite with them: and when they frequent places near the seacoasts, they will descend to the shores and demolish the uncovered shell-fish in very great numbers.

Their general places of rest are among the thickest bushes that can be found; and they are not easily put up out of them, but will stand the bay a long time. In April and May, they sleep more sound than at any other time of the year, and this is therefore the successful time for the taking them in the nets. When a boar is roused out of the thicket, he always goes from it, if possible, the same way by which he came in it; and when he is once up, he will never stop till he comes to some place of more security. If it happen that a sounder of them are roused together, when any one breaks away, the rest all follow the same way. When the boar is housed in the wood where he was bred, he will scarce ever

THE WILD BOAR.

is brought to upon it; he will sometimes make toward the sides to listen to the noise of the dogs, but retires into the middle again, and usually dies or escapes there. When it happens that a boar runs ahead, he will not be stopped or put out of his way by man or beast, so long as he has any strength left. He makes no doubles nor crossings when chased; and when killed makes no noise, if an old boar; the sows and pigs will squeak when wounded.

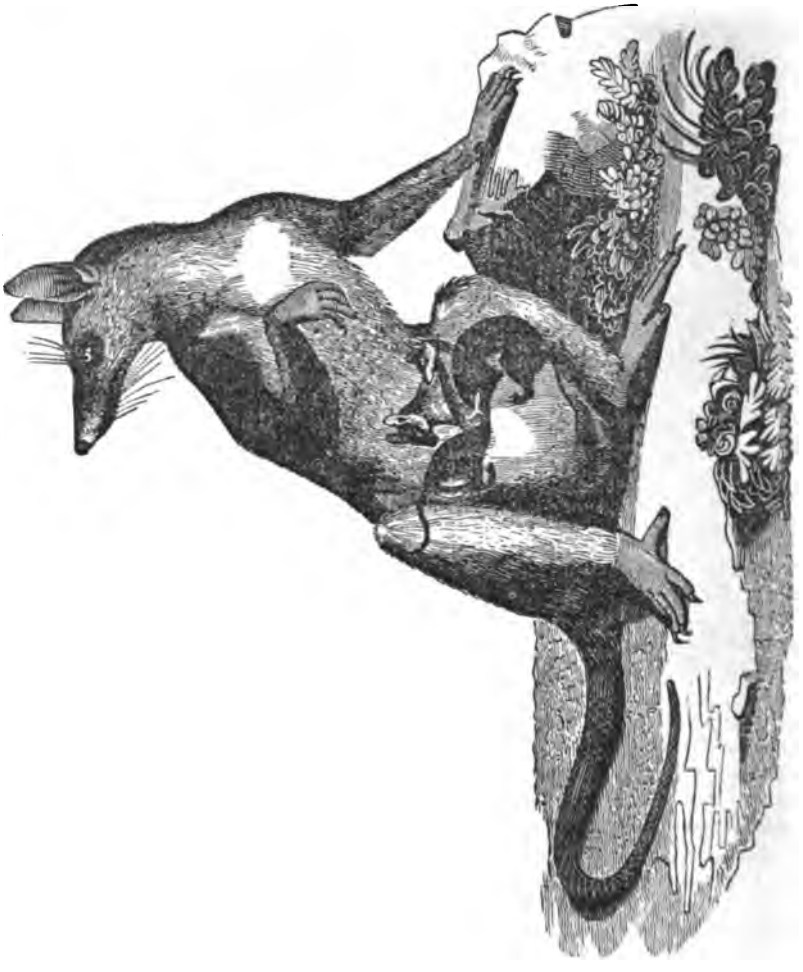
The season for hunting the wild boar begins in September, and ends in December. If it be a large boar, and one that has lain long at rest, he must be hunted with a great number of dogs, and those such as will keep close to him; and the huntsman, with his spear, should always be riding in among them, and charging the boar as often as he can, to discourage him; such a boar as this, with two or six couples of dogs, will run to the first convenient place of shelter, and there stand at bay and make at them as they attempt to come up with him. There ought always to be relays also set of the best and stanchest hounds in the kennel; for if they are of young eager dogs, they will be apt to seize him, and be killed or spoiled before the rest come up. The putting collars with bells about the dogs' necks, is a great security for them; for the boar will not so soon strike at them when they have these, but will rather run before them. The huntsmen generally kill the boar with their swords or spears; but great caution is necessary in making the blows; for he is very apt to catch them upon his mount or tusks; and if wounded and not killed, he will attack the huntsman in the most furious manner. The place to give the wound with the spear, is either between the eyes, in the middle of the forehead, or in the shoulder; both these places make the wound mortal.

When the creature makes at the hunter, there is nothing for it but courage and address; if he flies for it, he is surely overtaken and killed. If the boar comes straight up, he is to be received at the point of the spear; but if he makes doubles and windings, he is to be watched very cautiously, for he will attempt getting hold of the spear in his mouth; and if he does so, nothing can save the huntsman but another person attacking him behind: he will on this attack the second person, and the first must then attack him again: two people will thus have enough to do with him; and were it not for the forks of the boar-spears, that make it impossible to press forward upon them, the huntsman who gives the creature his death-wound, would seldom escape falling a sacrifice to his revenge for it. The modern way of boar-hunting is generally to despatch the creature by all the huntsmen striking him at once: but the ancient Roman way was for a person to lure, armed with a spear to keep the creature at bay; and in this case the boar would run himself upon the spear to come at the huntsman, and push forward till the spear pierced him through.

THE OPOSSUM.

(See page 176.)

It is a genus of marsupial, or pouched animals, inhabiting the American continent, and the first animals of this singular order which are known to naturalists. Their generic characters are ten incisive teeth in the upper jaw, and eight in the under, the intermediate ones in the upper jaw being longer than the rest; the three front grinders compressed, and the last four tuberculated; those sixteen triangular, but the under ones oblong, and two canines in each jaw, making in all fifty teeth, which is a greater number than is possessed by quadrupeds of any other genus. Their gape is wide, and the appearance of the



THE OPOSSUM.

small, equal; but their bite is feeble, compared with the size of their biting apparatus. Their tongues are beset with horny tubercles, like those on the tongue of a cat; and their tail is in part naked on the under side, and prehensile. Their ears are very large and naked, and their aspect is altogether very peculiar. Their hind feet have the thumb or fifth toe long, and capable of acting in opposition to the other four, so as to lay hold like a hand. The four toes which act together on the hind feet are furnished with nails; and when not used in grasping, the ungueless one is turned to the rear, like the hind toe of a bird. Their legs are short in proportion to the size of their bodies; they plant their feet upon the round pad of the sole when they walk, and their rate of motion on the ground is but slow. In trees, however, which the greater number of them chiefly inhabit, they have much power of themselves, and climb and hold on with much address. Their eyes have the irides yellow, and the pupils are vertical, like those of the fox. It has been said of them that they have a gape like a pike, the ears of a bat, the feet of an ape, and the tail of a serpent; such certainly, taking their characters all in all, they differ very much from the placental mammalia. The difference extends not only to the form of the body, and the structure of those parts upon which the classification is founded, but it extends to the very covering, the hair of the opossum being unlike that of most other animals. It is neither sleek nor frizzled; and it has more resemblance to whalebone than to common hair, and on the naked parts there are sometimes scales. This uncouth sort of covering, the semi-transparent ears, which appear reddish when seen against the light, the yellow sinister eyes, the short legs, and the singularly-formed feet, give these animals a repulsive appearance, which is in nowise diminished by the very fetid and offensive odor which they give out. The different species vary considerably in their habits; but they may be generally described as nocturnal animals, the principal part of which inhabit trees, in the holes of which they lodge; and they prey upon birds, birds, and other small animals. Some of them also haunt the waters, and feed upon shelled mollusca and crustacea.

All the species have the general characters of marsupial animals, the most remarkable of which in the skeleton are the two marsupial bones attached to the pelvis, which support the pouch.

They are, as we have said, all nocturnal animals; and they are all carnivorous; but they do not possess the same degree of power and energy as the carnivorous animals, properly so called: and they are remarkable for stupidity, or at all events they do not display the same cunning as the fox, though their eyes resemble those of that animal. Their habits are different, however, for the opossums, generally speaking, seek their prey in trees, whereas the fox is an animal which, though fond of brakes and other cover, is incapable of climbing. The form of their hind feet enables them to lay hold of a branch, and retain that hold, while they have a perfect command of the head and anterior extremities for other purposes. Thus they can make use of the crooked claws with which their fore feet are armed, to help them in the capture of their prey. At settlements near the woods, where they are plentiful, these animals are sometimes apt to play the weasel in poultry-yards; and, like that animal, they suck the blood of their victims.

THE HELAMYS.

[See page 179.]

The land at the Cape of Good Hope, where the animal creation assumes so many different and singular forms, is the native country of this singular quadruped, or rather of this strange biped, an engraving of which is presented to our readers on the following page.

The formation of the Helamys is very curious. It is but little larger than a rabbit; its posterior extremities are very long, and are provided with long feet, while the anterior extremities, which are extremely short, are terminated by hands. Its tail, also, is extremely well developed. Its eyes are large, full, and black; and its ears are very long. Its skin is of a yellowish brown, shaded with gray on the head, back, tail, and flanks, while under the chin, on the chest and belly, it is of a pure white.

The difference which we have mentioned as existing between the anterior and posterior extremities, is so great, that if the helamys were obliged to walk like other quadrupeds, it would experience great inconvenience, but, like the kangaroos, to which it is allied, it does not walk; it only leaps, and avails itself, to execute this rapid motion, of its hind legs, by which it can throw itself from eight to ten feet. In this motion its muscular tail is also of service; this is used as a kind of balance, and even, according to some authors, as a point of support to facilitate its leap; the head is then held erect, and the fore legs are adapted so closely to the body as to be invisible. It generally remains in an erect position, and never leaves it except in those cases where, under similar circumstances, man himself would go on all fours, as in descending precipices, &c.

The helamys, like the rabbit, dwells in subterraneous burrows, which it forms very quickly, by means of its long claws. It is extremely timid, and its habits are peaceable and innocent. At night it emerges from its subterraneous abode, in search of nourishment, and on the slightest alarm, hurries homeward. During the day it remains in its hole, and passes its time either in sleep, or in arranging its stores of winter provisions. It sleeps, however, a great deal, and prepares itself for repose by sitting down, its back against the wall of its apartment, its hind legs are then brought forward, are slighty separated, and bent at the knee; the head is now inclined to its place between the knees, and then its long ears are folded over its eyes like curtains. These arrangements are, as is seen, well calculated to keep all the limbs warm, to protect the delicate parts of the head, and to prevent the sleeper from being disturbed by any light or noise.

THE ORANG OUTANG.

[See page 181.]

The annexed engraving is copied from an excellent portrait in oil, of the female Orang Outang, Nancy, imported in the ship Liberty, Captain Davis, by Thomas Richards, Esq., and remarkable as being the largest living specimen of this most manlike species, the *simia satyrus*, or true wild man of the woods, which has as yet ever reached either America or Europe. She arrived at Philadelphia in the latter part of May, 1835. After a few days, having passed into the hands of new owners, she was sent to New York. She was unfor-

THE HELAMYS.

tunately much exposed to the influence of cold and damp weather during her transportation, and the evening of her arrival, was first observed to be unwell; on the succeeding morning, her disease had assumed the character of an irregular intermittent fever, and medical advice was resorted to. After lingering for some weeks, alternately better and worse, during which time recourse was had to every expedient which art or ingenuity could devise for her comfort and recovery, much to the regret of the few who saw her, she died at the village of Harlem, near New York, on the nineteenth of July following. The deathbed scene, as represented by those who were present, must have been singularly affecting. The account of it as given by her keeper is as follows. Early in the evening her extremities began to grow cold, and at ten o'clock P. M., pulsation at the wrists had ceased. She appeared conscious of her approaching end, and dreaded it. She shivered and groaned very much, and appeared to supplicate those around for assistance, often extending her arms to them and embracing them around the neck. She would awake from a doze in great trepidation, and cling to the neck of her keeper, where she would hang until sleep or exhaustion caused her to loosen her hold. This was frequently repeated as long as her strength remained. After violent struggles and much groaning, at three o'clock A. M., she had ceased to breathe. A careful anatomical examination of the body was made by several medical gentlemen, by whom copious notes were taken, and the several dimensions accurately noted. After the skin was removed, a cast of the head and chest was taken in plaster of Paris; over which the skin was afterwards stretched, and the whole is now mounted, according to its measurements during life, in good preservation, and is probably the most natural and accurate stuffed specimen extant. The skeleton and such portions of the body as were of particular interest were also preserved.

The only history we could obtain of Nancy, previous to her arrival at Philadelphia, was, that she was one of a pair which had been brought in a trading-vessel from Borneo to Calcutta, where they were kept as curiosities, for two years, in the gardens of a Rajah in that vicinity. That during a stay of three months at Calcutta, they had been the subject of much attention, and had attracted the special notice of Sir William Bentick, the then governor-general of India. That after they had been purchased, and were about being embarked for this country, they were both violently seized with cholera-morbus, and notwithstanding the most scientific treatment, the female alone survived. During the voyage she was for the most part confined to her cage; and her principal food was boiled rice, of which she consumed about one pint, three times a day, together with such fruits as they were able to preserve. She was exceedingly fond of cocoanuts, and was well acquainted with the method of extracting the milk, through one of the eyes. When in health, she is said to have been so strong, that if she once possessed herself of the end of a rope, not a sailor on board of the vessel could pull it from her. Her age could not be correctly ascertained, but from appearances, until the period of her death, she was presumed to have been an adult. The teeth being large and much worn, resembled those of an old subject. Subsequent examination, however, showed that she was comparatively young, as the second set of teeth were found just protruding through the jaw, but so covered by the soft parts, as not to be discernible during life. Her age, therefore, did not probably exceed five or six years.

Some idea of her superiority in "reasoning power," if we may so apply the phrase, over the ordinary specimens of the monkey-tribe, may be gathered from a few facts, which fell under the writer's immediate notice.

During the five weeks which he had an opportunity of observing her, notwithstanding she was constantly in the habit of using and handling vessels of

PORTRAIT OF AN ORANG OUTANG.

glass and china, she never broke, nor suffered any of them to fall. Every article was handled with extreme care, and generally returned by her to its place. She was also very curious in the examination of articles which were newly presented to her sight. After attentively looking at them, instead of carelessly throwing them down, as might have been expected, she invariably returned them, and generally into the hands of the individuals from whom she received them.

Upon a single occasion, a circumstance occurred, which evinced a judgment almost human. She was very fond of descending to the kitchen, and appeared much interested in observing the process of the culinary operations, and when unwatched, embraced every opportunity of stealing off to it. In the instance to which we allude, after looking about, she finally unbuttoned and opened the door of a closet, in which a basin of milk had been placed for the separation of the cream. After attentively looking at it, and on the several shelves, as if in search of something, she carefully closed the door, and presently taking a teacup from the table, she returned to the closet, and after helping herself to a cupful of the milk, again closed the door, and replaced the cup whence she had taken it. A vial of medicine was carried into the room, and placed upon the mantelpiece. The attendants then left the room, but kept an eye upon her. On finding herself alone, she arose from the corner where she had been sitting wrapped in her blanket, took a chair and carried it to the fire-place, mounted on it, took down the vial of medicine, uncorked it, poured the physic over the floor, recorked the vial and replaced the chair, and then resumed her former seat.

In height, when standing erect, and with the arms extended upward, this animal measured three feet six inches, and at the period of her death, although much emaciated, was supposed to weigh between forty-five and fifty pounds. The arms were very long, and when hanging down reached nearly to the ankles.

The following are some of her measurements :—Length of arm from shoulder to tip of middle finger, on the inner surface, thirty-one inches ; length of arm, ten inches ; length of fore-arm, twelve inches ; length from wrist to end of middle finger, nine inches ; length of middle finger, five and a half inches ; length of the thumb, three and a half inches ; greatest breadth of hand, two and three fourths inches ; from the tip of one middle finger to the tip of the other, across the chest, with the arms extended, five feet eleven inches. The fore-arm was flattened on its inner surface, Length from hip-bone to heel, on the outer surface, eighteen and a half inches ; length of thigh, ten inches ; length of leg to ankle joint, seven and a half inches ; from the heel to the end of middle finger, of the inferior extremity, ten and one fourth inches ; length of middle finger of same, five and a half inches ; length of thumb of same, three and a half inches ; length from ankle joint to root of nail of middle finger, eight and a half inches ; circumference of chest over the armpits, twenty-one and a half inches ; circumference at the base of chest, twenty-three inches ; of the abdomen, or belly, at the navel, twenty inches ; circumference over the hip-bones, nineteen and a half inches ; diameter of the head through the ears, four and three fourths inches ; from the occipital ridge to between the eyes, five inches ; from the most projecting portion of the chin through the vertex, eight and one fourth inches ; diameter through the centre of cheek bones, three and five eighths inches ; diameter from one corner of the mouth to the other, two and one fourth inches ; length of lower jaw, four and one half inches ; circumference of jaw, six and a half inches ; height of forehead from between the eyes to the commencement of hairy scalp, three inches ; weight of brain, twelve ounces, one drachm, and two scruples, troy ; the heart was six

and a half inches in circumference, three and one fourth long, and weighed two and a half ounces.

She was covered generally with a coarse hair, of a brownish red color, longest on the back, particularly over the shoulder-blades, where it measured nine inches in length; it was also longer on the outer surface of the arms, and on the inside of the thighs, as also in front over the chest and abdomen. It was short on the back of the hands, and on each side, from the armpits down, it was but thinly scattered. The palms of the hands and feet were quite naked. The face had no hair except on its sides, somewhat in the manner of whiskers, and a very thin and short down or beard.

The direction of the hair was downward on the back, upper arm, and legs, but upward on the fore-arm. It was directed from behind, forward on the head, and inward on the inside of the thighs. On the chest and abdomen, it was directed toward the median line. The prevailing color of the skin was a bluish gray. The eyelids and margin of the mouth, of a light copper color. The inside of the hands and feet, of a deeper hue. On each side from the armpits down was a copper-colored stripe, which gradually extended and combined with the prevailing color of the animal. The head when viewed in front was pear-shaped, expanding from the chin upward, the cranium being much the larger end. The eyes, of a dark brown color, and oval form, were placed close

together. The eyelids were fringed with lashes, and the lower ones sacular and wrinkled.

The nose, confluent with the face, was but little elevated except at the nostrils, and the openings of it were narrow and oblique. The mouth, of a roundish mamillary form, was very projecting, and its opening, though large, when closed, was marked by little more than a narrow seam. The lips were very narrow, and scarcely perceptible when the mouth was shut. They, however, possessed remarkably great mobility, and variety of action, and from her frequent apparent attempts to convey the expression of her feelings and passions, by means of the various forms and shapes in which she placed them, we hazard the opinion that such is their physiological use or destination; thus compensating, in some measure, for the want of power necessary to produce a variety of sounds, which has been frequently noticed to exist in this species of animals.

The chin is much less prominent than the mouth, and the skin in front of the neck being loose and flabby, presented the appearance of a double chin; when the animal was angry, or much pleased, the swelling increased very much, and assumed the appearance of a large tumor. Each of the jaws contained twelve fully-developed teeth; they were probably the first or milk teeth, as the rudiments of the new set were sufficiently well marked. The ears, though small, closely resembled the human ear, and the lower margins of them were in the same line with the external angles of the eyes. The chest was rather wider than the pelvis, and the abdomen flattened. The arms were long, in proportion to the height of the animal, and the legs short, when compared with the arms. The hand was long, in comparison with its width, and with the human hand, the fingers tapering, the thumb very short, scarcely reaching to the first joint of the forefinger. All the fingers were terminated with perfect nails, of a blackish color and oval form; they did not project beyond the tips of the fingers. The feet were long, resembling hands in the palms, and in having fingers rather than toes; but the heels resembled very much those of man. The great toes, or lower thumbs, were short, and set on at right angles to the feet, close to the heel. When walking on the ground, the feet were always turned with their palms inward, so that the only portion placed in contact with the surface, was the heel and outer edge of the foot, and the little toe or finger. The fingers or toes were doubled up, and the gait of the animal resembled very much that of the parrot.

THE CHIMPANSEE.

[See page 185.]

The Chimpansee is, as has been said, found both in the Asiatic isles and in Africa; and it is said to be of larger size and more handsome form in the latter country than in the former—that it has the arms shorter, walks more erect, and has the neck longer. These differences tend to show that the trees which have apes' food, are of smaller growth and further apart from each other than in Asia; and that also, in part, explains why none of the long-armed climbing apes are found in Africa, but have their place supplied by the baboons, which run well upon all-fours, and are more ferocious in their dispositions. The very few specimens of the chimpansee which have been seen in this country have been all of small stature; but they have been young, and we neither know the period which these animals require to attain their full stature, nor the circumstances by which their growth may be retarded or stopped Travellers say

THE CHIMPANZEE.

that they attain the height of an ordinary man; but there is reason to suspect that in that, as well as in some other points, their history has been confounded with that of the larger baboons. It is said that they live in small bands, and construct a series of huts for their common residence. The former is likely, as all apes are, to a certain degree, social; but the construction of the huts is doubtful, as it has not been borne out by what has been observed of other apes, or even of the same species in the East. The fact is, that the comparisons which have constantly been made between these animals and man, render it no easy matter to determine what portion of the reports which are given of them should be received, and what rejected: and the chimpansee is not so very like man, after all. The flat top of the head, the great round ears, and the short and scanty hair on the head, have nothing very human in their aspect. There is a ridge over the eyes, but it is not like an eyebrow; and the eyes have nothing human in their enforcement or their expression. The nose is merely a ridge on the muzzle; and the mouth, from the manner of its opening, as well as the extent to which it opens, is evidently intended for no purpose save that of biting. The lower jaw is not a chin either, in its anterior part, but merely a deep jaw, to afford insertion to the large teeth and the powerful muscle.

It does not appear that the differences which have been mentioned as existing between the chimpansees of Africa and of the Oriental isles, are sufficient to constitute a difference, or even a variety; the more so that we are but little acquainted with the appearance and habits of the adult animals in either region. All that can be inferred is, that they have to climb more and walk less, and their arms are lengthened and their legs shortened and weakened in proportion. Even those chimpansees which are the best walkers, do not walk as man does, by advancing the leg, while the body remains square to the front; they roll the pelvis, and the feet, instead of moving over straight lines, move over arches of circles, of each of which the opposite hip joint is the centre; and even in them the feet are far more efficient in climbing and grasping than in walking, which shows that climbing is the grand motion for which they are organized; and that just as much of the power of walking is added, as enables them to be the passing feeders upon fruits in those parts of the forests where the fruit-bearing trees are too small and far asunder for suiting the organization of the long-armed ape.

The face and ears of the chimpansee are of a brown color, and naked; but the skin of the face, especially, is withered and leather-like, and has no resemblance to the human skin in texture and gloss; it more resembles the naked parts of some reptiles, or those of the bats. The head, back of the neck, shoulders, and back, are covered with coarse black hair, rather long, and forming a sort of whiskers or tufts on the cheeks, but otherwise longest on the upper parts of the back. The arms have the hair inclining downward from the shoulder to the elbow, and upward from the wrist to the same, and these form a sort of ruff at the point of meeting. This position of the hair enables the fore-arm to be more readily thrust among the leaves, to pull the fruit. When there are hairs on the human fore-arm, they are not turned toward the elbow, but outward, and inclining to the wrist. So that, down to the very minutest particular, we find in the ape adaptations to peculiar localities and habits, not one of which can be traced in man.

Even the trivial name of this species (*troglodytes*) is in some sort connected with gratuitous analogies, and as such calculated to mislead. In ancient times there was a race of people known by the name of *troglodytes*, or "dwellers in caves," said to inhabit somewhere in the vicinity of the Red Sea, and to be of small stature and deformed outline; and so strong was the prejudice, arising

probably from this similarity of name, that Linnæus himself made man one species of the genus *homo*, and the chimpanzee, which of course was not so well known to Europeans in his time as it is now, another, under the name of *homo troglodytes*. Now it does not appear that the chimpanzee is troglodytes at all, inasmuch as it does not dwell in caves. It does not inhabit those regions in which the troglodytes of the ancients are said to have resided, and it is rather improbable that the ancients had any accurate knowledge of the places in which it is now found.

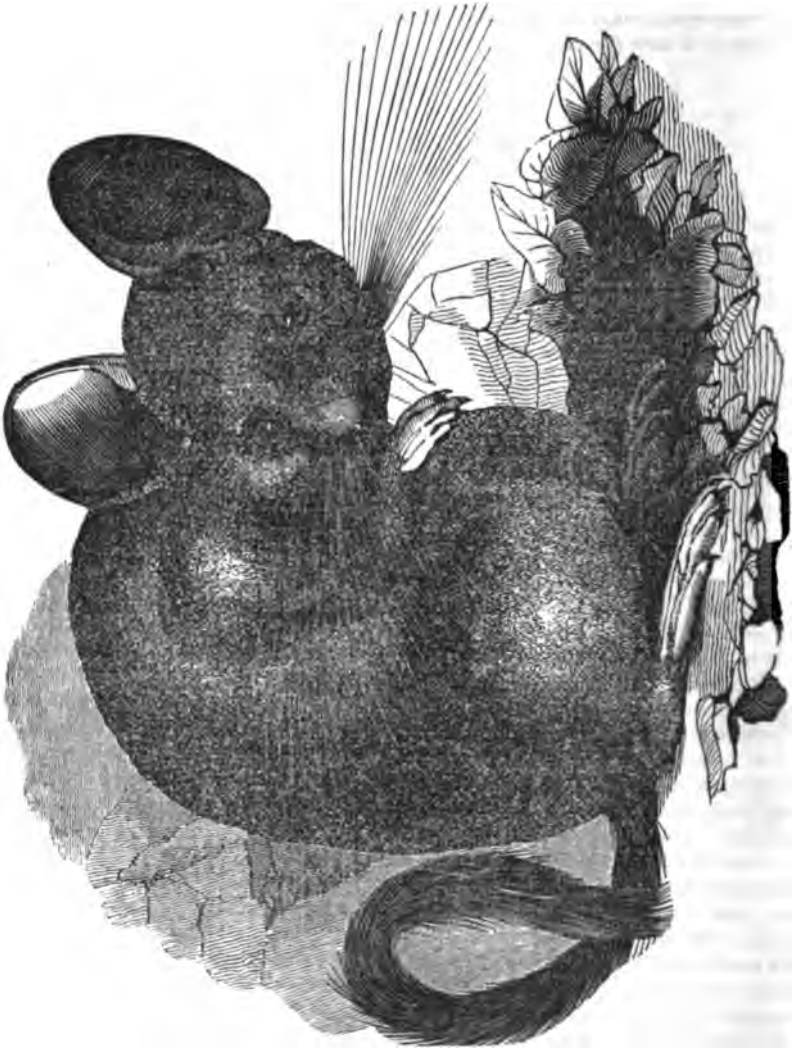
THE CHINCHILLA.

(See page 186.)

The cool, but fertile slopes of the Cordilleras of Chili and Peru are the native regions of this interesting and useful animal. Here they are entrapped by the needy inhabitants, in great numbers, for the sake of their skins, which, as our fair readers will be aware, form the softest and most beautiful of our winter furs. We shall describe its form and structure, its habits and instincts, its uses, and the relation it bears to other animals. In doing this, we may be allowed to remark, that it is only by such a comprehensive consideration of the objects of natural history, that any real or useful knowledge of them can be attained. Form and structure can only be properly understood by a comparison of similar forms in others; and, as form and structure are subservient to habits, instincts, and uses, being the means by which they are developed, the instruments by which they act; so neither ought they ever to be investigated apart, but always with the closest regard to each other. We have before us an animal living in the countries at the western feet of the Andes of South America, which feeds upon succulent roots, and, without any weapons of defence, exists safely and amply in the face of many enemies.

The Chinchilla is about eight inches long, from the nose to the commencement of the tail, which measures five inches. Its general form is characterized by shortness, thickness, and an aptitude for repose. Its hind limbs are much larger than the fore ones, and, by an ignorant spectator, would be proclaimed disproportionally large, while the latter would be regarded as much too small. There is, however, no such thing as "disproportion" in nature. The head resembles, in some degree, that of a rabbit, with round, naked, and very capacious ears, large dark-colored eyes, and a blunt nose. The whiskers are long and plentiful. The fore feet possess much of the character of a hand, and have each four short toes, and the rudiment of a thumb; the hinder feet have also four, three of them long, the middle one more produced than the two lateral ones, and the fourth, external to the others, very short, and placed far behind. On all these toes the claws are short, and nearly hidden by tufts of bristly hair. The tail is strong for the size of the animal, of equal thickness throughout, and covered with long bushy hair. The fur is long, thick, close, woolly, somewhat curlingly, of a mottled-ash color, whitish on the belly, but varying in strength and color in different parts of the body, and in different individuals.

The teeth consist of two short sharp-edged incisors in each jaw, and four grinders on either side, making twenty in all. The grinders are composed of three long plates, divided by two partitions of enamel, and the whole surrounded by a thick coating of the same. The structure of these being very curious, we have much pleasure in presenting our zoological friends with the accurate figures of them from original drawings.



THE CHINCHILLA.

Palate view of the skull, showing the upper teeth.

Profile, showing the lower teeth.

One row of upper teeth, larger than the preceding, to show their structure.

Profile, showing the same.

Jaw, showing the lower teeth.

Outs of lower jaw.

These structures are so exclusively adapted to peculiar habits of life, and minor different modifications are so common in allied families—the rats, squirrels, &c., for example—that without the testimony of actual experience, they might with very tolerable accuracy be conjectured. We recommend such a practice as one highly conducive to sound zoological knowledge. Particular forms are so surely indicative of corresponding habits, that out of a series of such predictions very few would be found to disagree with the written history.

An attentive consideration of the form and structure of the chinchilla will, therefore, have prepared the intelligent reader to anticipate the following account of its habits:

It lives in a cold, stony, and uneven country; accordingly, its fur protects it against the severity of the seasons, and enables it to enjoy a life of comparative quietude; while the length and strength of its hind quarters, legs, and tail,

give it the power of leaping easily over the irregularities of the surfaces on which it seeks its food. It rests and sleeps in a burrow made by itself. The necessity for this is found in the number of its natural enemies, in the slightness of its form, and in its greater susceptibility to cold while at rest or asleep than in its waking hours, which a thick coat of fur enables it to counteract. The ability to meet this exigency of burrowing, is seen in the shape of its fore paws, which have very much the form of hands, and in the shortness of its arms. The former enables it to rake the earth away, and the latter, by their shortness, allow the earth to be cast behind the body, while at the same time they offer no obstruction to the subterranean progress of the animal. In this way it is protected from the raven by day, the jaguar by night, and the cold at all times. Further, it feeds chiefly upon the roots of succulent vegetables. Here again its burrowing feet are necessary; but when the favorite root has been procured, they serve another and very important office. Our readers may have observed that a mouse, a rat, a squirrel, and many similarly-formed animals, eat their food by a *gnawing* process, during which, they sit upright upon the haunches, hold the food in their paws, and in that position nibble it. Now the structure of the teeth of the chinchilla is such, that it cannot well take its frugal meals in any other manner; accordingly, when a bulb, or other root, has been dug up, the little fellow comfortably seats himself, and taking it into his "hands," turns it in any suitable direction, and gnaws off a bit here, and a bit there, to the full satisfaction of his appetite. This adaptation of the various members of its body to the purposes required of them, is very pretty, and evidently the contrivance of a most beneficent Being. The food in the mouth is subjected to a severe grinding between its curiously-enamelled teeth, and sent to a stomach fitted to receive it in that state, and in no other.

The immense size of its smooth ears allows it to catch the most distant sounds; and the largeness of its eyes gives a corresponding power of vision, which, in ordinary cases, sets the craftiness of its enemies at defiance. The ear gives notice of danger—it may be in the horizon, or on the far-off mountain-top, but no matter, the excited eye perceives it, and a few rapid bounds brings the frightened creature to its burrow.

It is a clean, timid, and docile animal, and, in its native wilds, is fond of society. It produces a litter of five or six young ones, twice in the year.

Its structural forms and instinctive habits may be seen, greatly exaggerated, in the kangaroos and opossums, and as much diminished in the Guinea pigs and rats. Jerboas, mice, squirrels, beavers, and the like, exhibit intermediate relations. The analogies observable between these animals are extremely interesting, and shed mutual light on each other. They should be studied attentively.

THE CHAMELEON.

The Chameleon is an animal of the lizard species, about which so many stories have been told, and so much curiosity excited, that no apology need to be offered for the description here given. It is a native of various countries, particularly in the warm climates; and many of them are found about Smyrna, and other parts of Turkey. Its head is larger than the common lizard; and its back is shaped very similar to that of a pig. It has four feet, which are divided into claws resembling those of a parrot; and it has a long flattish tail, of which it makes great use in climbing, for thereby it will hang to the branches of a

The Chameleon.

-ee, as well as by its feet, and draw up its body to a resting place. Its tongue is three or four inches long, of a whitish gristly substance, round as far as the tip, which is hollow, and shaped like the end of a pestle, somewhat like the proboscis of an elephant. The tongue is contained in a sort of sheath, joined to the throat, from which the animal can dart it with extraordinary quickness upon flies that come in its way, or other small insects, on which it undoubtedly feeds, and not on the air, as some fictitious romancers have stated. In order to retain those flies, the tongue of the chameleon is supplied from its throat with a viscous or glutinous matter, which exudes from the tip, and secures the victim, which it then draws into its mouth. However, these animals can live a long time without taking any visible sustenance, and from this circumstance has probably risen the error of supposing that they live on the air alone: the fact is, that the lungs of the chameleon, reaching almost the whole length of its body, are so formed that it can draw in so much air as from a thin and lank appearance to seem full and gross. Its lungs are divided into two lobes, placed on each side of its body: they are of a thin membraneous substance, full of small veins, and therefore capable of expansion by a quantity of air; but being let out, they shrink, become flaccid, and the animal again appears lean and cadaverous. The head is immoveable, except as it turns with the body; but to recompense for that defect, it possesses fine eyes, about the size of a pea, which it can move in a peculiar manner, with different motions, the one backward, the other forward, one upward, the other downward; or fix one of them on any object, while the other moves in pursuit of some other: so that its eyes

are quite independent of each other, and capable of all the evolutions that can be imagined. The eye is formed with concentric circles, one within another, the innermost having an aperture about as large as the head of a pin, through which the light enters, and effects the power of vision. The animal does not appear to have any ears, but it has two small openings in the head, which serve for nostrils.

The most astonishing quality of the chameleon is the faculty of changing its color, and assuming that of the objects near which it is placed. The usual color of those observed about Smyrna is green, darker on the back, and lighter beneath, inclining to yellow, with spots sometimes reddish, sometimes whitish. There are many of them to be seen among stones, and on the earth, of a grayish color, like the stones and moss among which they breed; but on being handled, or removed to other places, they have not always appeared to take the color of that upon which they have been placed: and naturalists differ in their opinions, as to the reason or manner of the chameleon's changing its colors. Some maintain it is done by suffusion, others by reflection; and some think it is by the different disposition of the skin, which gives a modification to the rays of light.

THE RACKOON.

[See page 193.]

LARGER in size and more robust in stature than the Coatis, and approximating still more closely in their physical characters to the bears, which may be considered as the typical group of the plantigrade Carnivora, the Rackoons naturally occupy an intermediate station between the playful, timid, and harmless little creatures just noticed, and the powerful, clumsy, and dangerous tribe of bears. Like both bears and coatis, they have in each jaw six sharp incisors, two strong canines, and twelve cheek teeth, six on each side. But these latter differ from those of the bears, inasmuch as the whole six form a regular series, the three anterior ones of which are small and pointed, and the three posterior broad and surmounted by prominent and blunted tubercles; while in the bear the three anterior appear rather to form a supplemental appendage, being placed irregularly and at unequal distances, and not unfrequently falling out altogether as the animal advances in age: the tubercles on the crowns of the posterior ones are also much less strongly marked. The coatis exhibit nearly the same mode of dentition as the rackoons; but striking marks of distinction between them are afforded by the comparative length of the tail, which in the latter is scarcely half as long as the body; and by that of the snout, which, instead of being prolonged into an extensible muzzle, capable of being moved about in all directions, as in the coatis, is scarcely produced beyond the lower lip, and has very little motion. The strongly marked difference in physiognomy arising from this circumstance is increased by the width of the head posteriorly, which is so great as to give to the general outline of the face of the rackoons the form of a nearly equilateral triangle. Their ears are of moderate length, upright and rounded at the tip; their legs strikingly contrast in their slender and graceful form with the strong and muscular limbs of the bears; and their nails, five in number on each of the feet, are long, pointed, and of considerable strength. The whole body is clothed with long, thick, and soft hair; and its general shape, notwithstanding its intimate connexion with the bears, and its short and thickset proportions, is not without a certain degree of elegance and lightness.

The rackoons are natives of America, and the species which has been most frequently observed by naturalists, and which we are now to describe, is most frequent in the northern division of this continent. Indeed, it may admit of doubt whether it ever advances further south than the Isthmus of Darien, the animal described by M. d'Azara as identical with it being evidently a distinct species. Its fur is usually of a deep grayish black, resulting from the intermixture of those two colors in successive rings on each individual hair. The shades of color vary on different parts of the body, and are as usual much lighter below and on the inside of the legs. The face, which is nearly white, is surrounded by a black band of unequal breadth, passing across the forehead, encircling the eyes, and descending obliquely on each side towards the angle of the jaw. The whiskers are of moderate length; and the hair of the face generally, as well as of the legs, is short and smooth. The tail, which is thick at the base, tapering gradually to the tip, and covered with long hairs, has five or six brownish rings, alternating with an equal number of the lighter colors, which is prevalent on the lower parts of the body.

THE STRIPED HYENA.

Like both the cats and the dogs, the Hyenas are completely digitigrade; that is to say, they walk only on the extremities of their toes: but these toes are four in number on each of their feet, and are armed with short, thick, strong, and truncated claws, which are not in the least retractile, and are evidently formed for digging in the earth, a practice to which they are impelled by a horrid and hateful propensity, which we shall have further occasion to notice in describing their habits and mode of life. Their body, in shape much resembling that of the wolf, to which they also approach very nearly in size, is considerably more elevated in front than behind, owing partly to their constant custom of keeping their posterior legs bent in a crouching and half-recumbent posture. Beneath the tail, which is short and dependent, they are furnished with a pouch, in the interior of which is secreted a peculiar matter of a very strong and disagreeable smell. Their head is large and broad, flattened in front, and terminating in a short, thick, and obtuse muzzle. Like most carnivorous animals, they are armed in each jaw by six cutting teeth, and two canine, the latter of which are of considerable size and strength. The outermost pair of incisors in the upper jaw are much larger and stronger than the rest, and closely resemble the canine in form. The number of the molar or cheek teeth is five on each side in the upper jaw, and four in the lower; and all of them are remarkable for their extreme thickness and strength in comparison with those of the dogs and cats. Their tongue is similar to that of the latter animals in the roughness which it derives from the sharp and elevated papulæ with which it is covered.

Of the genus thus characterized there exist two well-marked and unquestionably distinct species, the striped hyena, or hyena vulgaris of modern zoologists, which there can be no doubt is also the hyena of the ancients; and the hyena crocuta, or spotted hyena, the tiger wolf of the colonists of the Cape of Good Hope. To these may probably be added a third species, which there is good ground for believing to be distinct, and which has lately been described by Dr. Andrew Smith, the superintendent of the South African Museum, under the name of hyena villosa: this is also a native of the vicinity of the Cape, and is denominated by the settlers the strand wolf, or strand jut. With the two latter we have, however, on the present occasion, no concern; the only animal of

The Striped Hyena.

this genus in the Tower belonging to the striped race, which inhabits the greater part of Asia and of Africa, penetrating in the former as far as India, and extending over all the northern part of the latter continent. It does not appear that the striped and spotted races are ever found to occupy the same ground; but the territorial limits which separate the one from the other have never been distinctly ascertained.

The striped hyena has for its ground color a uniform brownish gray, which is somewhat darker above than beneath. On the side of the body it is marked by several irregular distant transverse blackish stripes or bands, which are more distinct on the lower part. Towards the shoulders and haunches these stripes become oblique, and they are continued in regular transverse lines on the outside of the legs. The front of the neck is completely black, as are also the muzzle and the outsides of the ears; the latter being broad, moderately long, and nearly destitute of hairs, especially on the inside. The hair of the body is long, particularly on the back of the neck and on the spine, where it forms a full and thick mane, which may be said to be continued even upon the tail, the latter organ being furnished with strong tufted hairs of considerable length. The mane and the tail are both marked with blackish spots or stripes variously but irregularly placed. Much variety is indeed to be met with, as well in the ground color of the whole body as in the disposition of the markings, which are extremely different in different individuals.

THE PORCUPINE.

[See page 196.]

ALTOGETHER the Porcupine is one of the most remarkable of the order Rodentia. Without any pretensions to grace or beauty, destitute of the active asiduity of the squirrel, the speed of the hare, or the exquisite fur of the beautiful chinchilla, it nevertheless proves an attractive object in every menagerie. The curiosity and interest it excites are owing, no doubt, to the *chevaux de frise* of spines with which it is covered, and to the belief, not long since universally entertained, and even now not altogether relinquished, that it was capable of launching these darts with effect against an adversary. Into this error writers of ancient and modern days, and even travellers of distinguished talents have fallen; no wonder, then, that the generality of persons should have concurred in the vaccination. Aristotle, Pliny, and Oppian, record it as a fact; Aldrovandus adopted it. It is seriously alluded to by the anatomists of the Academy of Sciences of Paris; and Bosman says, "when the porcupine is enraged, it appears with extreme rapidity, having its spines all arranged, which are often two palms in length, on men and beasts; and it darts them with such force, that they are capable of piercing a plank." All this is a tissue of error; yet, as with many other popular errors, there is a color for its origin. When irritated, or called to act upon the defensive, the porcupine, unfurnished with teeth or talons for the combat, turns his back toward his enemy, buries his head between his fore-limbs, erects his quills, and shakes them violently, their agitation producing a rustling sound. If the assailant advance to close quarters, the porcupine pushes backward against him, and that suddenly and with great energy, so as to force the sharp points of the spines into his flesh, and inflict a most painful wound. Now the quills of this animal are but slightly attached to the skin, and when clashed together, it often happens that one or two, more loose than the rest, or about to be shed, are thrown off; and also that, when thrust into any object, they are very likely to remain fixed in the wound, instead of being withdrawn as the animal moves away. From these circumstances it is probable that the table of the spear-darting powers of the porcupine took its rise.

As we have adverted to the clothing of this animal, by which it is so peculiarly distinguished, we shall here proceed to describe it in detail. The porcupine is not the only spine-covered animal among the class of mammalia, to say nothing of several species which enter into the same group with itself, as the Canada porcupine, the fasciculated porcupine of India, and others; the same clothing is allotted to the hedgehog,

—"Whose day declining sheds a milder gleam."

It is also given to the *tanrec* of the Mauritius, and still more fully to the *echidna* of Australia. Even in the scale-bearing manis we see a modification of the same defensive armor. The spiny clothing, however, of the porcupine has its peculiar characters; it differs in its details from that of the hedgehog and echidna, as in the two latter, that of each has its own arrangement. It is the back of the porcupine only that is furnished with a panoply of spine. The head is ornamented with a long crest of slender, tapering bristles, capable of being elevated or depressed at pleasure; and the fore and hinder limbs, as well as the under-parts of the body, are clothed with stiff, short bristles, of a black color, lying close upon the skin. The dorsal spines are of two kinds; some, which seem intended to form a sort of cloak to the others, are very long, weak,

and slender, and incapable of inflicting injury; the main bed of spines, however, consists of shafts of great strength and solidity, from four to seven or eight inches in length, thick in the middle, and tapering to each end. The end inserted into the skin is formed into a small pedicle, the other end is extremely sharp and prolonged. Thus, by the action of a subcutaneous muscle, of great extent and considerable thickness, termed *panniculus carnosus*, the animal is capable of raising them, clashing them, or depressing them at pleasure. In their ordinary state, they lie nearly flat upon the body, with their points directed backward, but when elevated they radiate in every direction. If we take one of these spines and examine it, we shall find that, in structure, it closely resembles the shaft of a quill-feather, except that it is more dense and hard; but internally it consists of a pithy substance, invested with a coat of hard enamel, of which the point is entirely composed. On looking at the point more narrowly, we shall see that it is somewhat flattened, so as to present a sort of slight double edge, or raised line, the one opposite the other, and these edges are minutely jagged, the whole constituting a weapon of no trifling nature. Not only is the wound it inflicts very painful, but it is often very serious. We know of an instance in which a person was struck through the boot and severely wounded, the injury being attended not only with great inflammation, but presenting for a long time a very threatening appearance.

The spines of the porcupine are elegantly ringed with broad bands of black and white, and they make convenient "sticks for camel-hair pencils, steel pens," &c.

The tail of the porcupine is short, and indeed can at first scarcely be seen amid the spines which fall over it; when these are elevated, however, it is plain enough. It is not covered with spines, but with a crop of open hollow quills, each supported by a slender tremulous footstalk, vibrating with every movement. When agitated, they produce a rustling noise not unlike that produced by the tail of the rattlesnake.

THE OTTER.

[See page 199.]

All anglers, with honest Izaak Walton at their head, have an inveterate hostility against the Otter, inasmuch as it may be regarded in the light of their rival in the destruction of the finny race, but not a fair rival, since it is ever upon the spot, incessant in its exertions, voracious in the extreme, and works like a poacher during the night, nefariously thinning the river of the finest fish, and thereby depriving the angler of his anticipated enjoyment. The complaint that "the otter devours much fish, and kills and spoils much more than he eats," is very true; for where his prey is abundant, he only devours the fish from the head downward to the vent, leaving the tail as a witness against him.

Like the fox and wild cat, the otter is in fact a nocturnal beast of prey, remaining quiet in its retreat till the night has set in, when it begins its depredations, and continues them till the first beams of sunrise warn it to retire. The ease and celerity of its aquatic evolutions during the chase of its victims are astonishing: rapid as the trout is in its motions, arrow-like as its speed, the otter hunts it down, for his perseverance is equal to his celerity; he follows the fish in every turn and double, and maintains the pursuit with a pertinacity which generally ensures success.

"Fishes," observes Mr. Couch, "seem to have an instinctive dread of the

otter; for I am credibly informed that it has been seen to collect into a shoal a vast number of trouts in a river, and drive them before it until the greater part have thrown themselves on shore.

The otter usually avails himself of any convenient excavation in the bank overhanging the water, especially if covered and concealed by the twisted roots of a tree, or overarched by intertangled shrubs or bushes. Buffon says that the otter will even take up its abode among piles of floating wood. Sometimes, however, its retreat is at a considerable distance from its usual fishing haunt. In the month of March, or early in April, the female brings forth her young, from three to five in number, upon a bed of sticks or grass, in the excavation she has chosen for their concealment, and she attends them with great solicitude.

THE BEAVER.

These indefatigable creatures generally prefer the margin of lakes and rivers, though occasionally residing on the coast, or rather on such gulfs as receive a large body of fresh water, and are consequently less saline than the open sea. Those who traverse the banks of the Canadian rivers, or the northern parts of Asia, may observe the beavers beginning to assemble in great numbers, during the months of June or July, for the purpose of establishing a commonwealth. The place of rendezvous is commonly the station fixed for this purpose. If verging on a lake, of which the waters rise above their ordinary level, the skilful engineers do not erect a dam; if beside a brook or river, where the waters alternately fall or rise, they throw up a bank, and thus construct a reservoir, which uniformly remains at the same height. This bank, which resembles a sluice, and is frequently from eighty to one hundred feet in length, by ten or twelve wide at the base, is even more astonishing with regard to its solidity than its magnitude. For the purpose of constructing it, they select a shallow part of the brook or river; and if they find on the margin a large tree, so situated as readily to fall into the water, they begin to cut it down. But how, it may be asked, is this effected? Their fore-teeth answer the purpose of a woodcutter's hatchet, and they begin the work of felling at a foot and a half above the ground: while thus employed, the laborers assume a sitting posture. Independent of the convenience of this position, they enjoy the pleasure of gnawing the bark and wood, which is grateful to their taste, and which they prefer to any other diet.

While some of the most able are employed in felling large timber, others traverse the banks, and cut down the smaller trees, then dress, and shorten them to a convenient length, drag them to the margin of the river, and convey them by water to the place where the building is carrying on. And here it is worthy of observation, that these trees are uniformly of a light and tender kind. You will never see a beaver attack the solid and more heavy timber. Their great object is to select such as may be easily barked, cut down, and transported; and hence they prefer the alder, willow, or poplar, which grow beside the margin of their favorite rivers. They sink stakes into the water, and interweave the branches with similar stakes—an operation which implies the surmounting of many difficulties; for, in order to dress the stakes, and to place them at first in a situation nearly perpendicular, some of the laborers must stand upon the river bank, and hold the stakes with their teeth, while others plunge into the water, and dig holes in the bed of the river, to receive the points, in order to place them erect. While some of them are thus sedu-

Beavers employed in cutting down a cotton-tree.

busily employed, others bring earth in their mouths, with which they fill the interstices between the piles, ramming it firm, and using their tails instead of a hammer. These piles consist of several rows of stakes; and they work on, retreating to the bank, as it is completed. The stakes facing the pond are perpendicular, while the others, which have to sustain the pressure of the water, slope considerably, and thus the bank, which is frequently at least ten feet at the base, narrows upward. Consequently it has not only the necessary thickness and solidity, but the most advantageous form for supporting a considerable pressure, for preventing the escape of the water, and repelling its efforts. Two or three sloping holes are also constructed near the top, in order to allow the superfluous water to run off, and these they enlarge or contract, according as the river falls or rises; when any breaches occur by sudden or violent inundations, the industrious architects know how to repair them as soon as the water subsides.

This is their great work. The next care is to construct their dwellings. These are uniformly erected upon piles, near the margin of the pond, and have two openings, one facing the land, another the water. They are either round or oval, varying from five to eight or ten feet in diameter. Some consist of three or four stories, with walls of two feet thickness, and are raised perpendicularly on planks, or stakes, which answer the double purpose of floors and foundations; others consist only of one story, and then the walls are low in proportion, curved at the base, and terminating in a dome or vault. But however varying in height, they are uniformly of such solidity, and so neatly plastered both within and without, that they are impenetrable by the rain, and resist the most impetuous winds. The partitions, too, are covered with a kind of stucco, as well executed as if by the hand of man; their tails serving them for trowels, their feet for plastering. In the construction of these buildings, various

materials are used; wood, stone, and a kind of sandy earth, not easily acted on by water. When finished, they resemble the kraal of a Hottentot, and are carpeted with verdure, or branches of the box and fir. The opening that faces the water, answers the purpose of both a balcony and baths, for here they bathe, enjoy the summer breezes, and delight to spend their leisure hours, sitting half sunk in the water, and looking complacently over the open country. This window is constructed with the utmost care; the aperture is sufficiently raised to prevent it from being stopped up by the ice, which in the beaver's climate is often two or three feet thick. Should this occur, the busy masons set to work, slope the sill of the window, cut obliquely the stakes which support it, and thus open a communication with the unfrozen water. This element is so necessary, or rather so agreeable, that even a temporary privation appears to distress them.

During the summer months, they sedulously employ themselves in collecting an ample store of wood and bark, for winter provender. Each cabin has its magazine, proportioned to the number of inhabitants; this they share in common, and never pillage their neighbors. Some villages consist of twenty or thirty cabins. But such establishments are rare, and, generally speaking, the little republic seldom exceeds ten or twelve families, of which each has its own quarter of the village, its magazine, and separate habitation. The smaller cabins contain from two to six, the larger from eighteen to twenty, and even thirty beavers. But as the parties are generally paired, it is calculated that each society consists of one hundred and fifty or two hundred, who at first labor jointly in raising the great public building, and afterward, in select tribes or companies, to construct particular habitations. In this society, however numerous, universal peace is maintained. Their union is cemented by common labors, and rendered perpetual by mutual convenience. Moderate desires, with simple tastes, and aversion to blood and carnage, render them insensible to the allurements of war and rapine. They enjoy every possible good, while worldly men only pant after happiness. Friends to each other, they coalesce for mutual protection; and if they have any enemies, they know how to avoid them. When danger approaches, they apprize one another by striking their tails on the surface of the water, the noise of which is heard at a considerable distance, and resounds throughout their numerous habitations. In a moment they are gone; some plunge into the lake—others intrench themselves within their walls, which can be penetrated only by the fire of heaven or the arms of men, and which no animal attempts either to open or overcome.

THE MARMOT.

[See page 203.]

The Marmot is a genus of mammalia belonging to the order of *rodentia* or *gnawers*. The genus consists of two sections; or rather its family or group, consisting of two genera, which differ considerably in their structure. The characters are two very strong incisive teeth in each jaw, rounded on their anterior surfaces; no canines in either jaw; five cheek teeth on each side of the upper, and four on each side of the under, with their crowns furnished with ridges, and also with tuberculous points; the body thick and heavy; the head and eyes of large dimensions, but the ears small; the feet very strong, with five toes on the hind ones, and four, together with a rudimental thumb, on the fore. The claws upon all very stout and compressed, but better adapted for digging

than for prehension, though all the animals have clavicles, and can bring the fore feet to the mouth. The two sub-divisions, or sub-genera, which have been established by M. F. Cuvier, are chiefly founded upon the absence or the presence of cheek pouches; but, in the greater number at least, there is another important character which accompanies this; those which are without cheek pouches are social, living in considerable numbers, often several families in the same burrow; and those which have cheek pouches are solitary, living singly, or, at most, in pairs.

Like the rest of the order, they are without canine teeth, and in the sharpness of the incisors of the lower jaw they bear some resemblance to the great family of rats and mice, of which perhaps they may be considered as a subdivision, though, in some respects, they bear at least a slight resemblance to the squirrels, and their external forms, and also their manners, are peculiar. They have five grinders on each side in the upper jaw, and four in the under, the summits of which have sharp tubercles, so that they seem capable of subsisting on insects, and even on the flesh of larger animals, as well as on vegetables. Their bodies are thick and clumsy, their legs short and thick, their head large and flat, their ears short and blunted, and their tail short and apparently incapable of motion.

Some of them inhabit the most bleak and dreary situations, the summits of the most elevated mountains, such as the Alps, and near the margin of the region of perpetual snow. The chief food of these are no doubt the hard Alpine grasses, and other plants which are found in regions of so scanty vegetation; and these are found only for a part of the year, not more than half of it in the more elevated haunts of the animals. But in their habits they are as seasonal as the places where they reside; for when the cold weather sets in they descend into the depths of their burrows, and there remain in a dormant or hybernating state during the whole of the inclement season. Thus their years of activity are reduced to half years, and during these they are very slow in their motions, and at no time is there such action in their system as to occasion that waste and necessity for food which take place in more active animals. Accordingly, barren as their pastures comparatively are, they get very fat toward autumn; and are covered with lard like little pigs, or perhaps rather stored with grease like bears, when they retire to their winter domicils. Their hybernation, which is not, even in the greatest depth of its quietude, a total cessation of all the animal functions, is gradual at its commencement; and the recovery from it is also gradual. Owing to these circumstances, the fat is wholly absorbed by the time that the animals are able to come abroad; and in the brief space of their short year, they have to recover their strength, rear their broods, and again become fat preparatory to a new hybernation.

At all seasons they are ground animals, and spend the whole of their time, except what is taken up in feeding, in their burrows, which they dig with great ease and rapidity, and to a considerable depth, always sloping downward, so that the dwelling may be beyond the reach of the intense cold of the winter, and yet so contrived as to be in no danger of filling with water during the rains or the melting of the snow.

Some of them are animals of considerable size, not less than the common wild rabbit. But though easily taken, as their progressive motion is slow, and it is not very difficult to dig them out of their burrows, they are of little value to mankind as game. In autumn, when they are fat, the mountaineers do eat them, but they are not very palatable to those who have a choice of food. It seems indeed to be a pretty general fact, if not a law, in warm-blooded animals, that the more sluggish the functions of life are, the flesh of the animal is the less palatable and the less stimulant. But though the marmots are thus not

hunted with the same daring assiduity as the chamois and some others of their fellow mountaineers, they are still not without their destroyers, for the keen glances of the eagle is upon them as soon as they quit their burrows.

The elegant specimen represented in the engraving is a native of North America, and has on each of its sides a yellowish-white stripe, bordered with black, while the general color of its coat is gray. This species is very small, not exceeding nine inches in length, from the nose to the root of the tail; with a tail, including the fur, of not more than three inches.

As further illustrative of its real habits, it may be added, that in countries where rhododendrons are found, the marmots are said usually to fix their residences near or them; and that if ten or twenty of these plants are growing adjacent to each other, several burrows of marmots are always found immediately under the shade and protection of their leaves. Every animal has its own favorite vegetable.

THE BURROWING-OWL AND PRAIRIE DOG.

(See page 206.)

VENERABLE ruins, crumbling under the influence of time and vicissitudes of seasons, are habitually associated with our recollections of the owl; or he is remembered as the tenant of sombre forests, whose nocturnal gloom is rendered deeper and more awful by the harsh dissonance of his voice. In poetry he has long been regarded as the appropriate concomitant of darkness and horror. But we are now to make the reader acquainted with an owl to which none of these associations can belong; a bird that, so far from seeking refuge in the ruined habitations of man, fixes its residence within the earth; and instead of concealing itself in solitary recesses of the forest, delights to dwell on open plains, in company with animals remarkable for their social disposition, neatness, and order. Instead of sailing heavily forth in the obscurity of the evening or morning twilight, and then retreating to mope away the intervening hours, our owl enjoys the broadest glare of the noon-tide sun, and flying rapidly along, searches for food or pleasure during the cheerful light of day.

In the trans-Mississippian territories of the United States, the burrowing-owl resides exclusively in the villages of the marmot or prairie dog, whose excavations are so commodious as to render it unnecessary that our bird should dig for himself, as he is said to do in other parts of the world, where no burrowing animals exist. These villages are very numerous, and variable in their extent, sometimes covering only a few acres, and at others spreading over the surface of the country for miles together. They are composed of slightly-elevated mounds, having the form of a truncated cone, about two feet in width at base, and seldom rising as high as eighteen inches above the surface of the soil. The entrance is placed either at the top or on the side, and the whole mound is beaten down externally, especially at the summit, resembling a much-used footpath.

From the entrance, the passage into the mound descends vertically for one or two feet, and is thence continued obliquely downwards, until it terminates in an apartment, within which the industrious marmot contracts, on the approach of the cold season, the comfortable cell for his winter's sleep. This cell, which is composed of fine dry grass, is globular in form, with an opening at top capable of admitting the finger; and the whole is so firmly compacted, that it might, without injury, be rolled over the floor.

It is delightful, during fine weather, to see these lively little creatures sporting about the entrance of their burrows, which are always kept in the neatest repair, and are often inhabited by several individuals. When alarmed, they immediately take refuge in their subterranean chambers; or, if the dreaded danger be not immediately impending, they stand near the brink of the entrance, lively barking and flourishing their tails, or else sit erect to reconnoitre the movements of the enemy.

In all the prairie-dog villages the burrowing-owl is seen moving briskly about, or else in small flocks scattered among the mounds, and at a distance it may be mistaken for the marmot itself when sitting erect. They manifest but little timidity, and allow themselves to be approached sufficiently close for shooting; but if alarmed, some or all of them soar away and settle down again at a short distance; if further disturbed, their flight is continued until they are no longer in view, or they descend into their dwellings, whence they are difficult to dislodge.

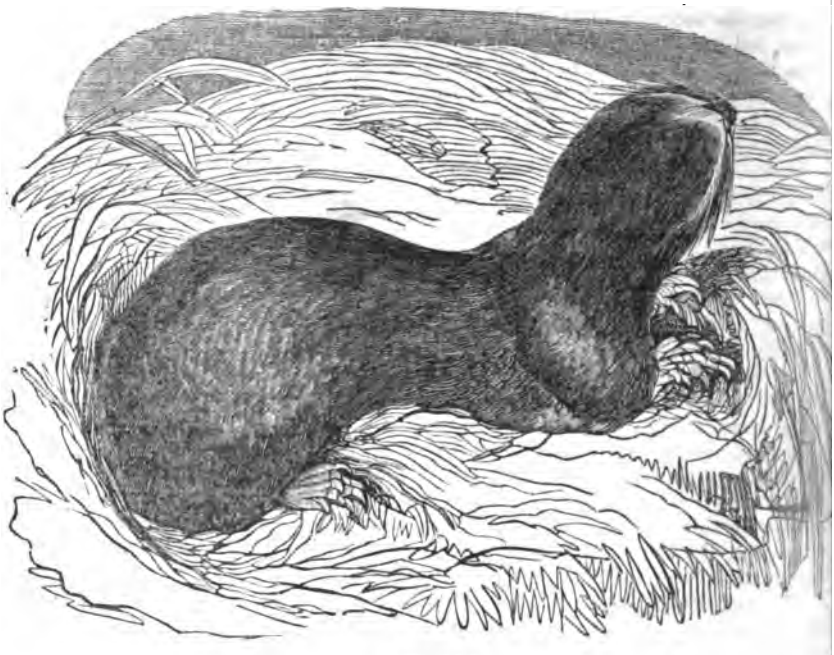
The burrows into which these owls have been seen to descend, on the plains of the river Platte, where they are most numerous, were evidently excavated by the marmot, whence it has been inferred by Say, that they were either common, though unfriendly residents of the same habitation, or that our owl was the sole occupant of a burrow acquired by the right of conquest. The evidence of this was clearly presented by the ruinous condition of the burrows tenanted by the owl, which were frequently caved in, and their sides channelled by their feet, while the neat and well-preserved mansion of the marmot showed the more care of a skilful and industrious owner. We have no evidence that the owl and marmot habitually resort to one burrow; yet we are well assured by Say and others, that a common danger often drives them into the same excavation, where lizards and rattlesnakes also enter for concealment and safety. The owl observed by Vieillot, in St. Domingo, digs itself a burrow two feet in depth, at the bottom of which its eggs are deposited on a bed of moss, herbs, and dried roots.

The cry of our bird is strikingly similar to the cry of the marmot, which emits the *chek, chek*, pronounced several times in rapid succession; and were the burrowing-owls of the West Indies, where no marmots exist, to use the same sound, it might be inferred that the marmot was the uninstructor in the young owl: this cry is only uttered as the bird begins its flight. The food of the bird we are describing appears to consist entirely of insects, as, on examination of its stomach, nothing but parts of their hard wing-cases were found.

The figure of the burrowing-owl is copied from C. Bonaparte's work, in which a representation of this singular bird was first given.

THE MOLE.

Of all the commoners of nature, the Mole perhaps is the most advantageously lodged. With the exception of sight, which is the weakest of all his senses, because it is the least exercised, his other organs possess extraordinary sensibility. But then, though his eyes are small, and his vision imperfect, the Creator has bestowed on him, by way of recompense, a placid contentedness of disposition, which, in the inferior, as well as the superior orders of creation, may be justly denominated a continual feast. He also enjoys a habit of repose and solitude, the art of securing himself from injury and disquietude, of instan-



The Mole.

taneously excavating an asylum, and of finding a plentiful subsistence without the necessity of going much abroad. His hearing is remarkably quick, his sense of smelling exquisite. His skin is fine, and he always looks in good condition. He has hands rather than claws; his strength is considerable, and he possesses an extraordinary degree of sagacity. Such are the characteristics of this laborious and contented creature; and though cherished in obscurity, they are preferable to more brilliant qualities when incompatible with safety.

Yet though the moles are isolated and retired, as regards their brethren of the field or wood, none afford more beautiful and impressive lessons of conjugal affection and tender consideration for their young. It seems too, as if, when they looked abroad from their Cimmerian habitations, they liked to see around them the life and business of husbandry, for their little domes are never discovered in uncultivated countries. They equally avoid the arid desert, and those northern regions, where the earth is frozen during the greater portion of the year. Seven species appertain to this race. They inhabit the temperate parts of Europe, America, and the Cape.

Some naturalists assert that the mole, like the badger, sleeps till the voice of spring invites him forth; but this is not correct. The latter often leaves his house in quest of food, as the print of his small footsteps on the snow evinces. The former sleeps so little during the winter, that he raises the earth in the same manner as in summer, and hence the proverbial saying, "Now a thaw approaches, for the moles are building up their houses."

The mole exhibits an admirable degree of ingenuity in constructing his subterraneous dwelling. If ever he abandons his asylum, it is only for the purpose

of seeking some more commodious situation, and the moment he has found it, he sets to work. He closes up the entrance of his retreat, apparently dreading the open air as much as the blaze of day, and carefully avoiding the neighborhood of swamps or hard and rocky soils. He selects, in preference, prepared and cultivated lands; but, if a small spring of water should unexpectedly surprise him, he hastily quits his dwelling-place for a more elevated station. The overflowing of a stream of river is, to him and his compatriots, the greatest of all possible calamities, and uniformly diminishes their numbers; hence they change their habitations according to the changes of the atmosphere. During winter, and in the rainy season, they retire to elevated places; in summer they [illegible] into the valleys, and if the drought continues long, they take refuge in some cool and shady place, along the banks of [illegible], or swift running streams.

None are more habituated to labor than this industrious engineer. His means of subsistence are concealed in the earth, and he is therefore continually at work. Long alleys, usually parallel to the surface of the soil, and in depth from four to six inches, constitute the evidence of his laborious life. A skilful [illegible], he forms his galleries with equal art and activity. At one time, he [illegible] the superficies of the soil; at another, he digs deeper, according to circumstances and temperature; but all his roads have passages of intercommunication. Should any thing disturb him, he hastens into a perpendicular tunnel, which he excavates in the depth of nearly two feet; should his passages or [illegible] be by any means disarranged, he comes instantly to repair them. While [illegible] employed, or in throwing up those little domes which are called mole-hills, he is said to pant and blow as if overcome with the exertion.

We may easily discover to whom these multifarious labors should be assigned, whether to youth or age, whether to the father of a family, or to one who is engaged in maternal duties. The tumps thrown up by the female are smaller and less numerous; those of the young are still fewer, imperfect, and of a zigzag form, while the terminating channels in trenches are nearly on a level with the surface of the soil; those, on the contrary, of the more able and experienced, are numerous, and thrown up as with a vigorous hand. It has been observed, that their hours of labor are sunrise and sunset, noon, nine in the morning, and nine at night; that they are less industrious in winter than in summer, and that their activity sensibly diminishes during cold weather, though they do not become torpid, as some naturalists erroneously assert.

SILKWORM.

Silk is the production of the *Bombyx mori*, or the silkworm of the mulberry tree. In other words, it is the web of a large caterpillar, which, at its full size, is about three inches in length. The real silk or silk-web, was first known to ancient Serica, a part of the Chinese Empire, and hence the Greeks called it Σηρικὸν, the Romans *Sericum*, the French *Sue*, the Italians *Seta*, and the English *Silk*. To Si-ling-chi, the worthy consort of the emperor Hoang-Ti belongs the honor of having been the first silk-culturist. "The empress [illegible] the silkworms from the trees, and, with the women attached to her household, endeavored to tend them with much care, in the imperial apartments, to supply them abundantly with mulberry leaves, and to keep them very clean." The fair sovereign also taught her women to card and weave, and convert the [illegible] into clothing stuffs, and to embroider them with representations of flowers and animals. This lady, deserving of immortality, lived about 700 years

First age too small to be represented.

Second age of the Worm.

Third age of the Worm.

Fourth age of the Worm.

Fifth age of the Worm.

Moth.

Cocoon.

Moth and its Eggs.

before Abraham, or 2,700 years before Christ. Silk subsequently became a profitable article of exportation. The traders of Serica carried their silken stuffs all over Asia, obtaining great prices and ready sales. From Persia, it found its way into Greece, about the year 325, B. C. From India, A. D. 274. It was known at Rome in Tiberius's time, when a law was passed forbidding men to debase themselves by wearing silk, fit only for women. Heliogabulus first wore a garment of silk, 220.

"But the secret of producing and manufacturing the silk was still kept in China until the sixth century, when it was obtained under the emperor Justinian, by the aid of two monks, who first brought the seeds of the mulberry, and who afterwards, in consequence of the promises of liberal rewards offered by the

emperor, returned on foot to China, and at the risk of their lives, brought the eggs of the insect in a hollow cane, the exportation of them from China being forbidden on pain of death." In 1130, some Greek manufacturers of silk, brought by Roger, king of Sicily, to Europe, settled at Palermo, where they taught the Sicilians, not only to breed up the silkworms, but to spin and to weave silk. The art was afterwards carried to Italy, and to the south of France. Venice invigilled silk weavers from Greece and Palermo, in Sicily, 1097. Silk mantles were worn by some gentlemen's ladies at a ball, at Kenilworth castle, in 1286. It was first manufactured in France, in 1521; in England, in 1604. Silkworms and mulberry trees were propagated by Henry IV., through all France, in 1559. The [illegible] silk manufacture from raw silk was introduced into England in 1620. [illegible] famous silk throwing machine was erected at Derby in 1719. The first experiment made in Germany was in 1598, but nothing of importance was accomplished, until Frederick the Great encouraged the silk culture, about 1744. Now, however, the knowledge of the art has extended throughout Europe, and in France it has become one of the most productive sources of wealth. That kingdom probably derives, judging from former data, 125,000,000 francs annually from the growth and fabrication of silk. The amount may be larger. The business is new in our country, but is rapidly extending itself, and promises soon to become a source of great gain.

The *modus operandi* in this business, from the hatching of the worm to the reeling of the silk, inclusive, is briefly as follows: The worm is hatched from a little ash-colored egg, no larger than a grain of mustard seed. From this, it attains its full growth in about 32 days, during which time it casts off its outer skin, generally four times, which are called moultings. The first moulting is usually about the fourth or fifth day; the second, the eighth or ninth; the third, on or about the fourteenth, and the fourth, about the twenty-second day. The intermediate times before and after and between the moultings, are called ages. At the time of each moulting, they cease eating, and remain some hours in a sort of torpid state; but between the moultings, they feed and grow very rapidly, and especially in the last age, they devour large quantities of food, considering their size. Their favorite food, as before remarked, is the leaves of the mulberry, although they will eat other leaves when very hungry.

At the end of the fifth age, they cease feeding, and begin the operation of producing silk. This operation lasts about four days, during which time they work day and night in spinning an exceedingly fine fibre, in which they wind themselves up in a ball of about the form and size of a pigeon's egg, and which may be wound or reeled off in a continuous thread. These balls are called cocoons. All that remains of the worm within the cocoon is a chrysalis, which, in about twelve days, changes into a little butterfly, or, as it is commonly called, a miller, of a grayish-white color, which eats its way out of the cocoon. These butterflies are nearly equally divided into males and females. The females are immediately impregnated, and in about 30 hours after leaving the cocoon, they commence laying their eggs, of which one butterfly lays about 400. The butterfly never eats, but dies in a few days after it has done laying. The eggs are kept in a cool place, to be hatched another season, or whenever the operation is wished to be repeated.

After the cocoons are completed, they are assorted, the soft from the hard, and the white from the yellow; the white cocoons being the most precious. Some of the best are selected for seed for the next year. After the floss silk is collected, the next thing to be attended to is the killing of the chrysalis in the remaining cocoons which are to be sold. This may be done by exposure

to a hot sun for three days, by baking them in an oven, or by steaming or scalding them. Care is taken that the heat is not so hot as to injure the silk. One or two of the cocoons are opened to ascertain whether the chrysalis is killed. When this is accomplished, and they are collected together for the purchaser, the business of the culturist ceases, and the labor of the manufacturer commences. It would be an unprofitable job for the culturist to sit down to *find the ends* of the thread upon the cocoons without the aid of conveniences previously prepared. The best course for the culturist, therefore, is to stop at the completion of the cocoons, and turn them over to the manufacturer. He throws them into hot water to soften the glutinous substance which holds the fibres together, and then gathers the ends of the threads by means of a stick notched at the end. When he has gathered several fibres he commences reeling, keeping the original number of fibres the same, by adding new ones, when any of the cocoons are run off. Each silk pod consists of one single thread, exceedingly fine, the length of which varies from 900 to 1200 feet. On an average, from seven to ten pounds of cocoons give one pound of silk. After reeling, the silk is spun, and woven into stuffs. The manufacturer's machinery is very nice and ingenious, and his art requires great care and skill.

THE HIVE-BEE.

[See page 213.]

THE Hive-bee is distinguished from all the other species of bees, by having the shanks of the hind legs furnished with a smooth and concave pollen plate on the outer surface, and destitute of spines at the extremity; by the basal joint of the tarsi, in the workers, being of an oblong form, with its inner surface clothed with fine hairs disposed in transverse layers; by the oblong shape of the body; by the maxillary palpi, or the feelers of the sheaths of the tongue, being almost obsolete and formed of a single joint, and by the oral apparatus being of an elongated form.

The hive-bee may be regarded as one of the most perfectly social species of insects, and one whose economy is regulated by the possession of a more perfect degree of instinct than is perhaps possessed by any other invertebrated animal. Another peculiarity, necessarily dependant upon the social habits of these insects, is the existence of individuals which have been regarded by many as a third sex, but which modern investigations have ascertained to be female insects, whose internal and sexual organization is in an undeveloped state. These individuals, neuters or mules, or workers, or female non-breeders, as they have been termed, constitute the great mass of the population of a society: they are the smallest members in the community, a circumstance probably dependant upon their imperfect organization; (if we may be allowed to use the term to an animal possessing such perfection of habits;) and it is to them that the internal economy of the hive is committed, and upon them the whole labor of the community devolves.

How skilfully she builds her cell,
  How neat she spreads her wax,
She labors hard to store it well
  With the sweet food she makes—
She gathers honey all the day
  From ev'ry opening flow'r.

Moreover, it is their duty to guard and protect the hive and the queen, to feed the young, and to kill the drone at the appointed season.

Part of the Comb.

Single Bee.

Section of Cell.

Part of the Swarm.

Female Bee.

Neuter Bee.

In a single hive, there are sometimes not fewer than thirty thousand of these individuals. They are distinguished from the fully-developed females by having a longer lip, the jaws not notched at the tip, and the sting straight.

The perfect female, of which there is but a single individual in a hive, is termed the queen, and is distinguished by her greater size, more elongate form, brighter color, shorter tongue, notched jaws, and curved sting. Her duty principally consists in the laying of eggs, and in her proceedings she is attended by a body-guard of workers, who pay her the greatest attention; hence, she is the mother of the hive, not indeed of the contemporary generation, but of the future inhabitants of the hive, as well as of the swarms of the following summer. It is one of the most curious points in the history of this insect, to notice the immense influence which this solitary female has upon an entire population of many thousand bees. And, indeed, did not the accounts which have been given respecting it depend upon authors of the most undisputed veracity, it would be next to impossible to consider them to be otherwise than as most marvellous and impossible *fables*. Reaumur, however, by dividing a hive, clearly proved the existence of the more than careful attention and respect with which the queen is regarded. He enclosed the two portions of the society in glass hives, and ascertained not only that such was the case, but also, that whilst in that division which possessed the queen, and but a small proportion of workers, the latter quickly made two combs, the portion without a sovereign, although far more numerous, did not construct a single cell; whence it is evident that the instinctive proceedings of the workers depend on the love of progeny; and what is the more remarkable, it is not for their own offspring that they are content to undergo all their labors, being totally incapacitated from becoming the parents of a hive.

The absence of the queen deprives the workers of no organ, paralyzes no limb, yet in every instance that they are deprived of her they neglect their duties, and unless provided with another queen they refuse food and quickly perish. How difficult is it to attribute these wonderful proceedings to any other cause than the possession of the most perfect reason.

The male bees, of which there are several hundreds, sometimes even two thousand, in a full hive, are idle creatures, doing no work:—

> On others' toils, in pampered leisure thrive,
> The lazy fathers of the industrious hive.

Their only duty is to impregnate the female, and this effected, they are driven from the hive and killed by the workers, who thereupon also destroy the male larvæ and pupæ remaining. They are generally termed drones, a term which has been misapplied to various species of flies which indeed much resemble bees, but which may at once be distinguished by having only one pair of wings.

These drones are of a more bulky size than the other bees, and they are not armed with a sting. Their antennæ are composed of thirteen joints; (those of the females and workers having only twelve articulations;) the head is more rounded, with the eyes larger, and meeting behind; their jaws are smaller and very hairy; and the basal joint of the posterior tarsi has neither pollen plate nor brush. They make a much greater noise in their flight than the others, and at the extremity of the body two small corneous appendages are to be observed of a yellow color, which, with some other internal organs, constitute the sexual apparatus.

In addition to these three kinds of individuals, it is to be observed, that there appear to be two sorts of females, namely, the large and small. Reaumur,

however, attributes this difference of size to the state of the eggs in the body. There are likewise two descriptions of males, one not larger than the workers, and supposed to be produced from a male egg laid in a worker's cell, and the other much larger, above described. Moreover, there are, according to M. Huber, two sorts of workers; the first, which he calls citrices, wax-makers, being charged with the collecting of food and secretion of materials for the building of the nest; and the second, which he calls nourrices, or nurses, smaller and more weakly, whose cares are directed to the feeding of the young and the domestic concerns of the nest. Huber also noticed another kind of bees, which he terms black bees, and which appear to be only casual inmates of the hive, from which they are always expelled, and often killed by the workers, with which, however, except in having the head and thorax of a darker color, they agree both in their external appearance and internal structure, having, like the workers, perfect ovaries, although not furnished with eggs. Messrs. Kirby and Spence throw out the hint that these black bees may be supernumerary workers, which have lost some of the hairs from off their bodies, and which, being incapable of contributing to the labors of the nest, are banished by the younger members.

Such are the inhabitants of the hive—the chief products of which are beeswax and honey. The former is secreted by the worker-bees from a peculiar apparatus on the under side of the belly, as occasion requires, and is employed for constructing the cells in which the family provision and the young brood are deposited. These cells are boiled in water, after the honey is extracted, until melted; the wax is then separated from the water, and being remelted, it is poured into moulds, in form the beeswax sold in our shops.

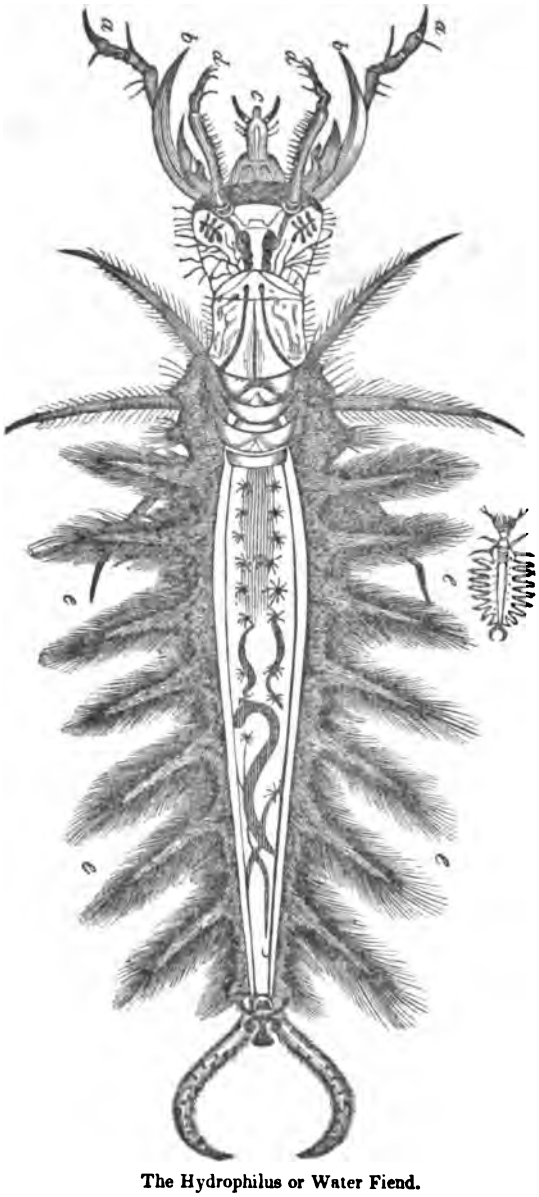
Humboldt informs us that not less than forty-two thousand six hundred and seventy arrobas of wax, worth upward of one hundred and thirty thousand pounds, were exported from the island of Cuba in a single year. This product is for the most part obtained from the common hive-bees; a quantity by no means inconsiderable is, however, procured from various species of wild bees.

Honey is obtained by the bees from the nectaries of flowers, which, as is well known, are constantly secreting a sweet nectarial fluid. This is sucked up by the tongue of the insect; a portion of it is consumed at once for its support, but the majority of the supply, although taken into the stomach of the bee, is again regurgitated and poured into the cells of the hive for the food of the young and the use of the community during winter. These cells are placed in the most inaccessible parts of the hive, and are closed with waxen lids, but the honey destined for the use of the nurses, workers, and drones, is deposited in unclosed cells.

THE HYDROPHILUS, OR WATER FIEND.

This insect, of which the cut is a representation, is of a fierce disposition, with a strong carnivorous appetite; it is armed for this purpose with very deadly weapons, which it uses with the most destructive ferocity.

Messrs. Kirby and Spence, speaking of the family to which it belongs, have the following interesting account of its nest, which may be found in almost any pool during the month of May. "In form," say they, "it somewhat resembles a lamp when reversed; since it consists of a pouch of the shape of an oblate spheroid, the great diameter of which is three quarters of an inch; and the small, half an inch; from which rises a curved horn, about an inch long, and



The Hydrophilus or Water Fiend.

terminating in a point. The animal (then in the beetle state) "is furnished with a pair of anal spinners, which move from right to left, and up and down, with much quickness and agility; from these spinners a white and glutinous fluid appears to issue, that forms the nest or egg pouch, which it takes the animal three hours to construct. The exterior tissue is produced by a kind of liquid and glutinous paste, which, by desiccation, becomes a flexible covering impermeable to water; the second, which envelops the eggs, is a kind of light down, of great whiteness, that keeps them from injuring each other. The tissue of the horn is of a silky nature, porous and shining, and greatly resembling the cocoons of butterflies. At its base is the opening prepared for the egress of the larvæ when hatched, which is closed by some threads, that, by means of the air confined in the cocoon, or pouch, hinder the water from getting in. This nest does not float at liberty in the water till after the eggs are hatched, the parent animal always attaching it to some plant. By means of this unusual process for a beetle, which this insect is instructed by Providence thus to perfect, the precious contents of its little ark are secured from the action of the element, which is to be the theatre of their first state of existence, from the voracity of their enemies, until the included eggs are hatched, and emerge from their curious cradle."

The newly-hatched larvæ grow rapidly, and in accordance with a law which has been observed to prevail among carnivorous animals, the head, with the

jaws and its appendages, are developed more rapidly than the other members. All its parts are so transparent, that the circulation of the vital fluids can, with the microscope, be easily perceived, as well as the motions of the principal viscera. In the full grown larva, its body is of an oblong spindle shape, and carries from its sides seven pairs of oars (*c*), with which it paddles its way through the water with great speed. This of itself is well worthy of close observation, and should be viewed in connexion with instruments for similar purposes in other insects. The subject is varied and interesting—"some move by the same motion of the legs as they use in walking, or by strokes, as in swimming; others, for this purpose, employ as oars certain plates, which terminate their tails, or, as in the present case, fringe the sides of the body; others, again, swim like fish, with an equal motion; some move by the force of the water which they spit from their arms; and others again swim about in cases." But to return to our description, the larva has six legs, well armed with claws, a large head, strong pointed antennæ, and very powerful jaws. The animal is generally of a yellowish brown color; and in length about an inch and a half.

Dr. Irving, who minutely examined this creature, and to whom we are chiefly indebted for our figure, states, that in the capture of its prey, considerable address is exhibited. He says that if its victim should have any one part more vulnerable than another, that part is always first attacked. The usual mode of procedure is as follows. The Hydrophilus, swimming horizontally, turns up his head at right angles with his body, and surveys the space above him; when he perceives his prey, he rises gradually beneath it, and seizes it with the feelers (*a*), and grasping it firmly, pierces it to death with his jaws (*b*); he then brings it to the point of the sucker (*e*), and speedily exhausts it of its juices. But should the insect attacked be covered with a shell or hard skin, so as to make the abstraction of nutriment difficult, the hydrophilus then crushes it between the inner scissor-like jaws (*d*), and sucks it at leisure.

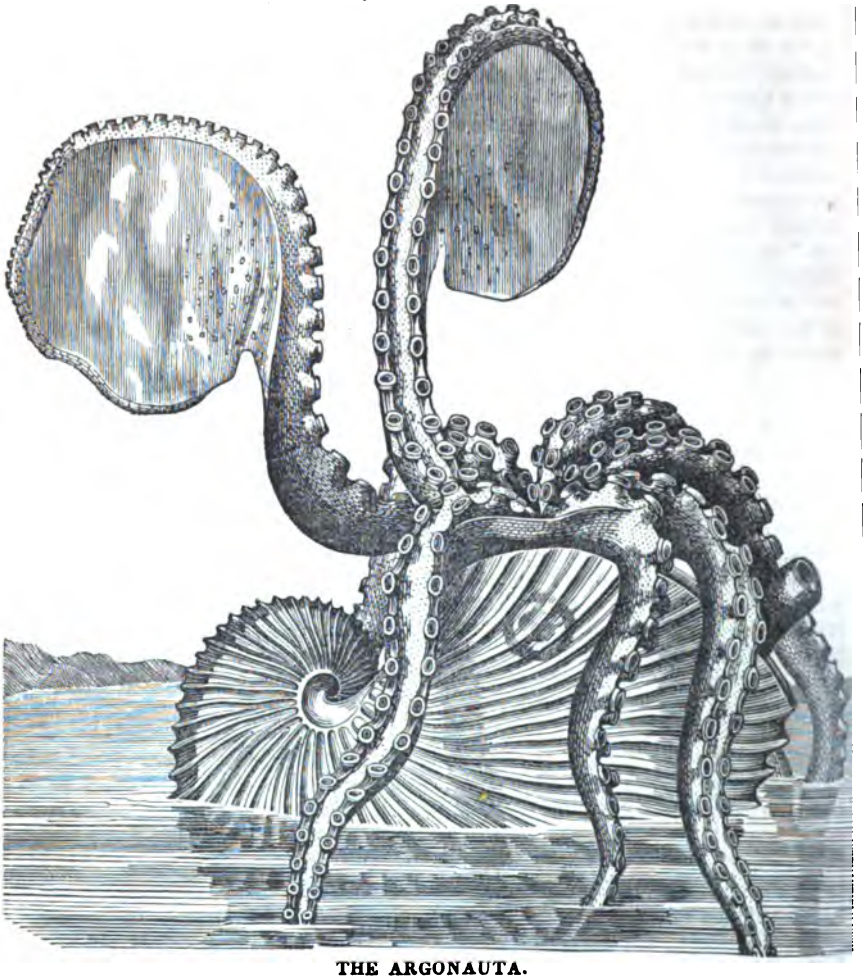
After it has laid in this state a considerable time, it bores a hole in the earth at the bottom of the pond, and buries itself, and here it changes into the chrysalis or pupa state. In this process, the skin upon its back splits, the head, legs, &c., fall off, and the pupa emerges. After a while, it undergoes its final metamorphosis, and comes forth in the form of a perfect beetle.

These beetles are amphibious, and live occasionally both in water and on land.

THE ARGONAUTA.

(See page 216.)

This interesting and elegant shell is generally well known to collectors by its trivial name of the Paper Nautilus; some authors indeed have suggested the propriety of calling it the *Argo nauta papyracea*, as being more descriptive of its delicate paper-like structure; but as this shell was known and described with considerable accuracy by Aristotle, Pliny, and other early writers on natural history, the generic name should be preserved, and with the greater reason, as it was given with a classical allusion to the celebrated expedition of Jason in the ship Argo, to recover the golden fleece; in which all those who accompanied him were called Argonauts, and to whom the art of navigation is generally described as having been pointed out, in the skilful management exhibited by the industrious little sailor, inhabiting the Argonauta, while steering its frail bark through ocean's trackless paths.



THE ARGONAUTA.

> "For thee to mock the voice of ocean spake,
> Or, from the creatures thy instruction take,
> Learn of the little Nautilus to sail,
> Spread the thin oar, and catch the driving gale."—Pope.

In fine calm weather, when the bosom of the sea is unruffled, the argonauta is said to have been observed gently rising with the keel of the shell turned upward, in order, it may be supposed, to present less opposition in its ascent through the water; this may be mechanically effected by the animal ejecting a portion of the water contained in its shell, thereby rendering it specifically more buoyant; but what peculiar organization enables it either to rise to the surface, or sink into the depths of the ocean, cannot yet be satisfactorily explained. When it has reached the surface, it gradually assumes its sailing position, extending three tentacular appendages, which passing over the thickened aurform notch on either side of the shell, serve as so many oars, while in the centre of these, two spoon-shaped membranes are elevated, acting as sails, to catch the passing breeze; and thus this pretty boat is propelled and guided on its way through the azure main. On the approach of any sudden danger, or of tempestuous weather, the little mariner lowers the sails, and withdrawing the oars, retires into the hull of its vessel, again sinking to the bottom of the ocean, undismayed by the perils of the deep, a circumstance elegantly alluded to by Byron, when describing the dangerous vicissitudes of a sailor's life.

> "The tempest Nautilus, while storms the main,
> Vibrates on ribs of this shell canoe;
> The ocean-flea, the fairy of the sea,
> Sports for her freaks, and, skims f more free!
> Or, when the lightning-winged tornadoes sweep
> This world, in vain, his peer is in the deep,
> Amid thousands of the armadas of mankind,
> Which shake the world, yet crumble in the wind."

This interesting little animal has perhaps furnished more matter of dispute, a greater diversity of opinion, and, in some instances, more ill will among naturalists, than any other subject in the whole range of animated nature; and during a period of more than two thousand years, the question is not yet decided, nor apparently nearer being so, whether the animal invariably found in the Argonauta is the architect of that shell, or merely a pirate. As it does not however form any part of the object of this work, to take up the dispute on either side; and as we do not arrogate in ourselves the power of elucidating a matter so involved in doubt, we shall only for our part say, that the animal never having been found in any part of the world living *free* from the shell, though certainly not conclusive, is good presumptive evidence of its being "the lawful owner of its fairy bark." Whether it should be considered one of the genus Octopus, or, as others imagine, Octopodus, it appears to us quite certain, that none but a similarly organized animal could have constructed such a dwelling; an opinion we deem in some extent confirmed by an examination of the mollusc, whose smooth thickened aurform processes on either side of the aperture, appear to serve as points d'appui for the tentacular members said to act as oars, and they are therefore wisely so constructed, to prevent the laceration that might otherwise ensue from the constant action of rowing, had those parts been formed thin and cutting, as is the case with the other portion of the aperture.

THE BOA CONSTRICTOR.

(See page 220.)

The serpents form a division of the reptile class too well known by their elongated scaly bodies, and their total deprivation of external members, to require any minute description of their organization. They are also held by the generality of mankind in so much abhorrence, and regarded for the most part with such strong feelings of unmitigated disgust, that we feel but little inclined to dwell upon their history, how much soever they may on many accounts be considered as deserving of a more extended notice.

They are frequently divided into two great sections; the one, which is by far the most numerous, comprehending all those in which the poison-fangs are wanting, and which are consequently dangerous only in proportion to the extent of their muscular force; and the other consisting of those in which the fangs are present, and the bite of which is accompanied with the pouring out of a venomous secretion. At the head of the first of these divisions rank the Boas, which in the Linnæan arrangement comprehend all those snakes, whether venomous or not, whose under surface was covered with narrow transverse plates, and whose tail was destitute of rattles. Later zoologists have, however, confined that appellation to those among the Linnæan Boas, which are without poisonous fangs, and have claws near the vent, and have regarded as a distinct genus the snakes which in addition to these latter characters have the scales of the under surface of the tail so arranged as to form two distinct rows. To the latter, which inhabit the Old Continent exclusively, (while the former are all of them natives of America,) they have assigned the name of Python.

The present species, which is commonly exhibited under the popular but erroneous title of the Boa Constrictor, appears to be the Podda Poda of Dr. Russell's Indian Serpents. It is said by that writer to attain a length of eight or ten feet; but living specimens have been brought to England of twice that size and some of those now in the Tower are fifteen or sixteen feet long. The number of transverse plates on the under surface of the body is stated to be two hundred and fifty-two, and that of the pairs of scales beneath the tail sixty-two. The back is elegantly marked with a series of large irregular black blotches bordered with black; and numerous smaller spots are scattered along the sides. The ground color is yellowish brown, lighter beneath.

The extent of muscular power which these serpents possess in common with the Boas is truly wonderful. To the smaller among them the lesser quadrupeds and even birds fall an easy prey; but the larger, when excited by the stimulus of hunger, are capable of crushing within their spiral folds the largest and most powerful of beasts. The sturdy buffalo and the agile stag become alike the victims of their fatal embrace; and the bulk of these animals presents but little obstacle to their being swallowed entire by the tremendous reptile, which crushes them as it were into a mass, lubricates them with the fetid mucus secreted in its stomach, and then slowly distending its jaws and œsophagus to an extent proportioned to the magnitude of the object to be devoured, and frequently exceeding by many times its own previous size, swallows it by one gradual and long-continued effort.

The poison tooth is connected with a very beautiful chain of bones, which, by the assistance of appropriate muscles, raise it for inflicting the bite. Before and after that, it lies folded back in the mouth.

The poison is secreted in two conglobate glands, which lie one on each side of the head; and is carried by ducts to the root of the fangs, where it is dis-

THE INDIAN BOA.

charged into the poison bag. This consists of muscular fibres, both longitudinal and circular, by which it contracts when the fangs are erected, and by this contraction the poison is pressed into the hole at the root of the tooth, and forced out at the aperture near the point.

The poison itself is an acid with many saline ingredients, which rapidly crystallize on exposure to the atmosphere. It exists only in small quantities, but a very small drop is sufficient to produce death.

In the engraving, a full grown boa constrictor is represented destroying a tiger. Its mode of procedure is as follows:—The serpent lies coiled in the top of some lofty tree, where, hid from observation, it securely watches every thing that passes beneath. Should an animal, a tiger for example, approach the spot, and the appetite of the serpent be strong, it cautiously descends to within a proper distance, fastens its tail by several folds to a branch, and then first throws its whole length upon the astonished animal, coils with inconceivable rapidity round his body, and striking his fangs deep into the flesh, instils the "venal venom." Convulsions, sickness, and death follow. The serpent then coils itself round the body of its victim, and by a tremendous exertion of muscular power, crushes the bones, and reduces the whole to a cylindrical form, and then covering it with slime, slowly swallows it. Having thus gorged his prey, he lies in a torpid state, for a shorter or longer period, in some cases exceeding two months.

THE CROCODILE.

(See page 224.)

The Crocodile is a genus of saurian reptiles, forming, along with the alligator and the gavial, a well marked and very distinct family, the largest, most powerful, and the only ones which are in any way dangerous to the human race.

The characters of the whole family are: size very large; tail flattened on the sides; fore feet with five toes, hind with four, of which the outer one is without any claw; all the feet are more or less webbed; a single row of teeth in each jaw; the tongue fleshy, flat, and so much attached to the sides of the under jaw, that the ancients supposed it to be wanting; the back and tail covered with large and strong scales of a square form, ridged at the middle; and a crenated scaly crest along the tail, forming a double row at the basal part; the scales on the under part are square, but small, smooth, and without any keel.

The mouth of these reptiles is a very formidable instrument, although it does not answer all the descriptions that have been given of it. The lower jaw extends farther back than the upper, so that there is room for the insertion of very powerful muscles, both for opening and for closing this jaw, the motions of which are as extensive as they are powerful. It is not true, however, that these animals have a motion in both jaws, as was believed by the ancients, and is still asserted in some of the works on natural history; and it is easy to see that such a motion would do them harm rather than good.

There are some of the serpents which can not only turn both jaws till they are in the same plane, but dislocate the opening considerably beyond the mere measure of the two jaws, when they have occasion to swallow large prey. But the mouths of these serpents do not form an analogy for the mouths of the crocodile family. In serpents, the mouth is generally only a swallowing apparatus.

THE CROCODILE.

rous, and those which capture large prey are either poisoning serpents, which kill by the fangs, or crushing serpents, which kill by the folds. The crocodiles, on the other hand, are biting animals, which kill with the mouth; and such animals would have little or no power if they had a motion in both jaws. The action of muscle against muscle in an animal, would be the least profitable way in which it could exert its strength, as the effect would be only equal to the difference of the exertions after the stronger muscle had forced the weaker one to a state of rest; and thus, the animal would lose an effort equal to double that made by the weaker muscle. There are no such mechanical bungles as this in nature; and it is a good rule in judging of the truth of what is alleged of any animal, to consider whether that which is alleged is consistent with the utmost perfection of mechanical skill—the producing of the greatest effect by the least exertion; and if this is not the case, we may rest assured that that which is alleged is not true.

The nostrils of the crocodile are formed externally of two slits which cross each other, the angular pieces between serving as little valves to close the aperture when necessary; they lead by a long canal through the palatal and sphenoid bones to an opening in the back part of the mouth; the ear closes externally by means of two fleshy lips, which close it like valves; the eyes have a third eyelid; and there are under the throat two small holes, which lead to glands secreting an unctuous matter which smells very strongly of musk. So abundant is the quantity of this matter, and so powerful its scent, that in warm countries, where crocodiles are abundant, they perfume the whole country around the rivers.

The vertebræ in the neck of the crocodiles are furnished with a sort of false ribs on the sides, which hinder flexure in that direction, and thus the animal cannot turn its head very readily aside, or even turn its body, for animals which have the neck stiff always have difficulty in turning laterally. But the crocodile can turn the neck very readily, so as to elevate the head till the line of it forms less than a right angle with that of the body; and it can also move the head very rapidly from this elevated position to one rather lower than the horizontal line.

These motions of the neck answer better with the habits of the animal than if they had been in the other direction; for the crocodiles do not pursue their food either along the banks of the rivers or in the water. They are liers in wait, as is the case with all large and heavy animals of predatory disposition, unless it be those species which have the wide sea for their field of chase. The crocodile is a powerful animal even upon land; but its chief scene of action is in the water, where it watches by the places to which land animals come to drink, with only the point of the nose above the surface; and as, at those times, it is perfectly still, other creatures approach near it without being aware of their danger. When the animal comes sufficiently near, the mouth of the crocodile opens rapidly to a great extent by the bending backward of the head and upper jaw upon the joints of the neck as a centre of motion, and the moving of the under jaw in the other direction upon its own articulation. Thus, in the opening of the mouth, there is a motion of both jaws from each other, and when they are again closed, the upper jaw does descend to meet the lower one; but the motion of the upper is not against that of the lower, as they are not articulated on the same centre or the same bone. Hence the peculiar motion increases the force of the bite instead of diminishing it; as the bite is given with both jaws, which when they come to a state of rest, the upper offers a point of solid resistance to the under.

LIZARDS.

[See page 227.]

The Lizard family is the second family into which Cuvier divides his second order of reptiles, *Sauria*, and following immediately the crocodiles, which some of the larger species resemble a good deal in their appearance, though they are very different in their habits.

Lizards are found chiefly in the warmer parts of the globe; and though many of them frequent marshy places and the margins of the waters, they are all to be considered as properly land animals, and not aquatic ones. Many of them can swim, and do take to the water; and some of the larger of these, which are of considerable size, though small in comparison with full-grown crocodiles, prey upon small animals in shady places by the sides of the water, and occasionally upon fishes; yet they have not the strength nor the ferocity of the crocodiles.

The distinguishing characters of the lizards are: the tongue slender, extensile, and forming two filaments or branches at the point; as in various kinds of serpents, they all move with rapidity, though in this respect there are considerable differences between them; they have five toes on each of their feet, three to their bases of unequal length, more especially on the hind feet, and all furnished with claws. Their bodies are lengthened; and their scales on the belly and tail are ranged in transverse bands. The tympanum is on the same level with the head, or only a little raised; a production of the skin, in which there is an opening, which acts as a sphincter, protects the eye by acting something in the manner of a third eyelid. The false ribs do not extend entirely round the body, so as to form a complete circle. The opening of the ear is oval, and very conspicuous; but there is not an elevated crest either on the head or along the back. The tail is, at least, as long as the body. It is of a cylindrical form, and composed of jointed rings, and without upper crest. The feet are all nearly of equal length; and under each thigh there is a range of small porous scaly tubercles. There are five distinct toes on each foot, terminated by crooked claws. A good many of the species are found in woody situations, where they seek their food among the foliage, or in the underwood. This food consists chiefly of insects. Others inhabit ruinous buildings; and they are even met with near the habitations of man, subsisting partly on insects and partly on vegetables. A few others are found frequenting marshes, ponds, or lakes, where they prey on the small animals which inhabit them. The lizards are, generally speaking, active, lively reptiles, and, all circumstances considered, may be reckoned the least repulsive of all the saurian tribes. They are perfectly innocent in their manners; and not a few of them are of an agreeable form, and beautifully colored, constituting pleasing objects in the scenery of tropical countries. This is especially the case with many of the smaller ones, which reside in dry places, and resort to the trees, among which their motions are often so rapid that they bear no inconsiderable resemblance to finely-colored birds.

Though the true lizards have not the ferocious disposition of the crocodiles, and few or none of them give out those poisonous, or otherwise offensive secretions which are given out by some other saurians, yet there are sometimes prejudices against them merely on account of their form, though others are highly esteemed in consequence of real or supposed services which they render to mankind by destroying animals more offensive than themselves.

The *Lacerta Scincus* is a species of lizard found in Arabia, Nubia, and Abys-

Lacerta Gecko.

Stellio Spinipes.

Lacerta Scincus.

sinia. It is remarkable for the readiness with which it forces its way into the sand when pursued, a proof of its strength and activity, which seem to be intimated in the Hebrew name *Coach*, force and prowess. There is another species of scincus, the *Sc. Cyprius*, which is of a very large size, and abounds in the Levant; it is green, with smooth scales. This was perhaps included under the common term *Coach*.

The *Lacerta Gecko* is a species of lizard found in countries bordering on the Mediterranean; it is of a reddish gray spotted with brown. It is thought at Cairo to poison the victuals over which it passes, and especially salt provisions, of which it is very fond. It has a voice resembling somewhat that of a frog, which is intimated by the Hebrew name, importing a sigh or a groan.

The *Stellio Spinipes*, as seen in the engraving, has a swollen body; it is entirely of a beautiful green, with small spines upon its thighs, and upon the ridge of the tail. It is found in the deserts about Egypt.

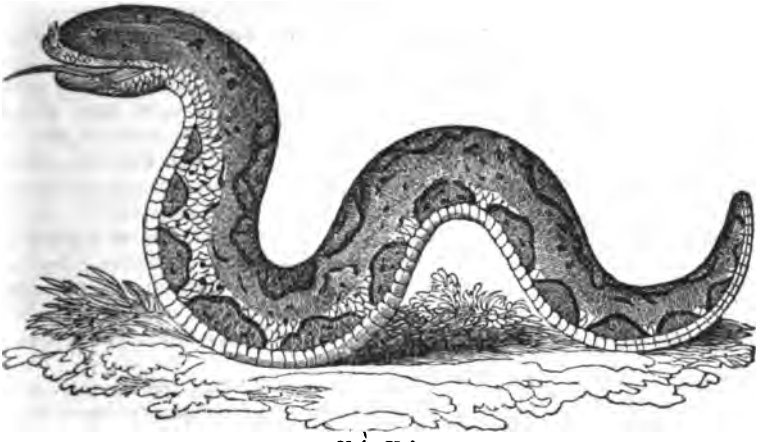
The *Lacerta Stellio*, a beautiful little lizard of Arabia, is noted for bowing its head, insomuch that the followers of Mohammed kill it, because they say it mimics them in the mode of repeating their prayers. It is about a foot in length, and of an olive color shaded with black.

Lacerta Stellio.

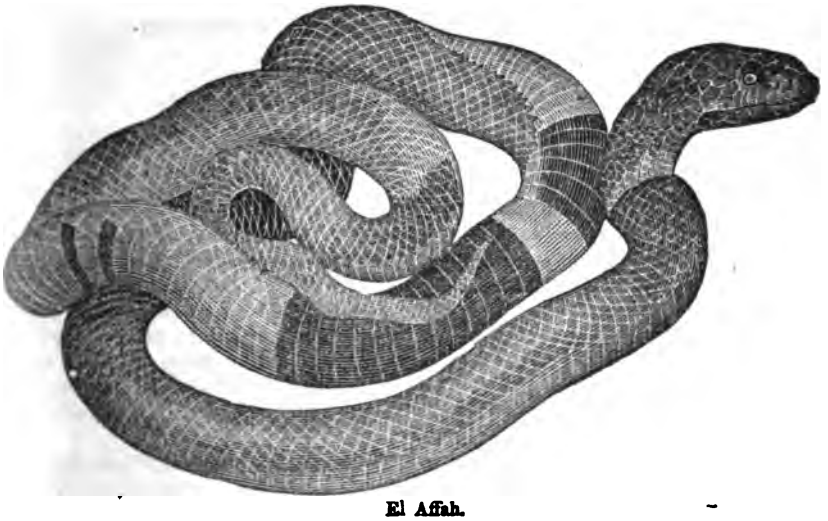
THE VIPER.

[See page 229.]

THE Viper family, or rather tribe, admits of sub-division into four sections; the first having the scales on the head of nearly the same size and character as those on the upper part of the body, and this is a distinction between them and the non-venomous colubers. The second have large plates on the top of the head, resembling those of the colubers, but they have the poison fangs apart like the former; the third, the tail flattened like an oar for swimming, or otherwise different from the typical vipers; the fourth have the poison fangs in the same



Naia Haje.



El Affah.

row with other maxillary teeth, only larger in size, and the scales on the belly and tail like those of the *boa* and *crotalus*, but as they do not inhabit the same part of the world as either of these, there is no danger of confounding them in wild nature. They make in all ten genera, or sub-genera, in Cuvier's arrangement.

Naia Haje. This is an Egyptian species, which has been celebrated from the remotest antiquity. The inflated neck, and often the erect attitude, which we observe in the serpent of the ancient paintings and sculptures of Egypt, is proof that this is the serpent which they made the emblem of the protecting divinity of the world, and, as such, placed it as a guard, at each side of the globe, upon the portals of all their temples. There is little doubt, that, if Cleopatra did poison herself by the bite of a serpent, the haje was the *aspic* which she employed for the purpose—only it could not have been procured from the mud of the Nile, as it is not aquatic. Its markings are greenish and brown; and it cannot inflate the anterior part of the body like other vipers. It has been taken advantage of by the jugglers, as well as its congener, who, by pressing its occiput, can make it as stiff as a stick, so as alternately to seem a rod and a serpent. The power that it has of erecting itself when alarmed, or otherwise excited, is probably the reason why the office of a guardian was conferred upon it.

El affah, is the name of the other serpent remarkable for its quick and penetrating poison. It is about two feet long, more or less, and as thick as a man's arm, beautifully spotted with yellow and brown, and sprinkled over with blackish specks. They have a wide mouth, by which they inhale a great quantity of air, and when inflated therewith they eject it with such force as to be heard to a considerable distance. These mortal enemies to mankind are described by Jackson, as abounding in the desert of Suse, where their holes are so numerous that it is difficult for a horse to pass without stumbling.

THE SEAL.

[See page 221.]

In the natural history of Seals there is very much that yet remains to be elucidated. This need not surprise us, when we consider the ignorance which exists concerning mammalia much more within our reach than these marine animals. We have not, indeed, as Cuvier remarks, the means, except by deduction and analogy, of ascertaining the habits of these half-amphibious animals, while procuring their sustenance at the bottom of the sea; nor have we often the opportunity of watching them, in an efficient manner, in their favorite haunts, the isolated steril rock, or the most retired and deserted strand. We are, however, acquainted with the physical structure of the animal, and possess some knowledge of its character and habits.

The family of *Phocæ* includes a considerable variety of species, the distinguishing characteristics of which it is not necessary to enumerate. We shall state the circumstances of structure and habit in which they all agree, unless otherwise mentioned. The form of the body of the seal bears a general resemblance to that of a fish. The short limbs are chiefly enveloped in the common integument, the part which appears externally serving the purpose of a fin or paddle. The hind feet are placed at the extremity of the body in the same direction with it, serving the purpose of a caudal fin; the fore feet also are adapted to swimming; and the toes in both the fore and hind feet are

furnished with claws, and united by a membrane. Neither the thighs nor legs of either the fore or hind extremities are visible, which gives an appearance of extreme shortness to the limbs. This occasions the animals to crawl on land with great awkwardness and seeming difficulty; but they move easily and gracefully in the water. By means of their fore feet they can lay hold of objects with sufficient firmness to drag themselves up shores, and even on shoals of ice, however slippery they may be. Even on land they move with more quickness than their appearance would lead one to expect; so that it frequently happens that when they have been dangerously wounded, hunters are unable to overtake them before they get to the water's edge and throw themselves in.

The tail is very short, and is placed between the hind feet. Some of the species are furnished with external ears, while others have only small auditory orifices. The eyes are large and prominent; and the nostrils open or close at the will of the animal. The upper lip is provided with strong whiskers, and the body is usually covered with hair. The internal structure of seals is similar to that of land quadrupeds, and atmospheric respiration is therefore indispensable to their existence, though they are capable of remaining under water a long time. In the arctic regions seals are sometimes found under the ice at the distance of many miles from open water; and they then form circular breathing holes, even though the ice should be several feet thick. These openings are kept clear; but the surface is allowed to freeze over partially, so as to conceal them effectually, except from very experienced eyes. Cuvier remarks, that the nostrils of the seal are seldom opened except when it is desirous of expelling the air from its lungs, or introducing fresh air. They then assume a circular form. Respiration in the seal is extremely unequal, and often performed after long intervals. There are generally from eight to ten seconds between each inspiration, and the operation is sometimes suspended for half a minute without apparent inconvenience. It would seem that the nostrils are habitually closed, and that the act of opening them is attended with some effort. The quantity of air, however, that enters the lungs must be considerable, to judge from the motion of the sides, and the air expelled at each respiration. The quantity of the air seems to compensate for the paucity of the inspirations; for few animals have more natural heat or a greater quantity of blood than the seal.

The dental system varies considerably in the different species, and would seem to indicate a corresponding diversity in their habits; but the form of the teeth and jaws shows them to be mostly carnivorous, and their food appears to consist generally of fish, crabs, and sea-birds, which they are able to surprise while swimming. The mastication, at least in the common seal, goes no farther than to reduce the prey to such dimensions as may render it barely capable of passing the larynx and œsophagus. To produce this effect they generally confine themselves to pressing the prey between their teeth, not so as to divide it in pieces, but merely to contract it in size. Sometimes they will tear their prey with their claws; but they are more frequently observed to swallow it entire, even when apparently too large for their mouths. Thus they are frequently compelled to raise their heads to facilitate the operation of deglutition, so that the weight of the aliments may contribute to make them slide into the œsophagus and stomach, and favor the efforts of the muscles. Nature has facilitated this operation, not only by providing the animal with the means of distending excessively all the parts through which the aliment must pass, but has also supplied them abundantly with a viscous saliva, which fills the mouth to such a degree, that during deglutition it escapes in long threads; and this is also observed to take place even when the seal only perceives its prey.

The females produce two or three young, generally in the winter season;

continue to feed them for about a fortnight in the place where they were brought forth; and suckle them nearly in an upright position, resting on their hind legs. When the cubs have acquired sufficient strength to contend with the waves, the mother conducts them to the water, and teaches them to swim about in search of food. The attachment of seals to others of the same species, and especially to their own offspring, is highly interesting. When in danger, the safety of her cubs is the chief object of attention with the mother, and even when badly wounded she is often known to succeed in carrying them off to sea in her mouth. The male parent, particularly of the ursine seal, seems to take scarcely less delight in the young than the mother. While basking in the sun upon the shore, he eyes them with the greatest complacency, and expresses his satisfaction by licking and kissing them as they sport and tumble about, and engage in sham fights before him. Seals are many years in attaining their full growth, and Buffon is inclined to believe that the duration of their lives often extends beyond a century.

The hunting of seals is prosecuted with great eagerness, and in various modes, by the Greenlanders, Finlanders, and others. The mode generally used by the former people is exhibited in our engraving. The Kamtschatkadales connect strong ideas of honor and glory with the hunting of the Maned seal. In the chase of a single animal they will expose themselves to the greatest dangers, wandering over the waves for days together without any other guide than precarious glimpses of the sun and moon; and he who kills the greatest number, either by blows of a long stick or with poisoned arrows, is regarded as the most heroic. As the adventurous sportsmen deem it disgraceful to leave any part of their game behind them, they sometimes overload their limber and crazy boats, and, disdaining to save their lives by relinquishing any portion of their highly-prized acquisitions, proudly perish with them in the waves.

THE SABLE-HUNTERS.

Hard is the lot of the Sable-hunter; doomed by the edict of an unfeeling tyrant to chase that beautiful animal, the sable (*M. zibellina*), so much celebrated for the rich furs in which he is wrapped, and so admirably adapted to the cold regions of the farthest North. The sable inhabits high frozen mountains; its capture, during winter, and in the midst of eternal snow, is the most painful of human labors. In former times, the hunting of these animals was a task imposed on Siberian exiles; but as that country became populous, the sables gradually retired into more lonely forests, and still higher mountains; yet even there the unhappy exiles are constrained to follow them. We are told that, when about to proceed on this hazardous undertaking, they form themselves into troops of from five to forty each; if more numerous, they sub-divide into lesser parties, and each chooses a leader: one chief directs the expedition. An interpreter, and a small covered boat, laden with provisions, accompany the separate divisions, with a dog and net for every two men, and a vessel to bake their bread in. Thus equipped, the parties set forth on their assigned course. They ascend the rivers, and draw up their boats till they have arrived at the hunting-country, where they stop, erect their huts, and wait till the waters are frozen over, and the hunting-season commences. They then assemble, unite in prayer for success, and commence their arduous enterprise.

More fully to appreciate the hardships to which these poor hunters are exposed, let us consider the general aspect of the country. High-peaked mountains,

Sable-hunting.

capped with ice, are conspicuous on every side; the earth, covered with snow during nine months of the year, is extremely barren, and everywhere encumbered with unwholesome marshes, and impenetrable thickets; the native region of black foxes, sables, and ermines, creatures invaluable to the inhabitants, as supplying both food and clothing.

There, through the prison of unbounded wilds,
Barr'd by the hand of nature from escape,
Wide roams the Russian exile. Naught around
Strikes his sad eye, but deserts lost in snow,
And heavy-loaded groves, and solid floods,
That stretch, athwart the solitary vast,
Their icy horrors to the frozen main;
And cheerless towns far distant, never bless'd,
Save when its annual course the caravan
Bends to the golden coast of rich Cathay,
With news of human kind. Yet there life glows;
Yet cherish'd there, beneath the shining waste,
The furry nations harbor; tipp'd with jet,
Fair ermines, spotless as the snows they press;
Sables of glossy black, and dark embrown'd,
Or beauteous streak'd with many a mingled hue,
Thousands besides, the costly pride of courts.

Such of the sable-hunters as penetrate into the woods, mark the trees, in order to retrace their steps. In their hunting-quarters they form huts, and bank up the snow around them. Near these they place traps, then advance farther, and place others, still erecting huts as they go on, and returning from time to time, to take out and skin the game. While thus employed, they are supplied with provisions, which are brought on sledges from such magazines as they have formed on their route. When the sables become scarce, the hunters trace them over the new-fallen snow to their holes, place nets at the

entrance, and sometimes watch the coming out of the animals for two or three days. Thus circumstanced, these hapless exiles are frequently so pinched with hunger, that in order to alleviate its intolerable cravings, they tie two thin boards, one to the pit of the stomach, another to the back, drawing them together by cords placed at the end. Such are the hardships which our fellow-creatures undergo, to supply the wantonness of luxury. When the season of the chase is over, the hunters reassemble, to report the number of sables they have taken, make complaints of offenders against their regulations, punish delinquents, and share the booty. They then continue at headquarters till the rivers are clear of ice, when they return home, and give to every church the dedicated furs.

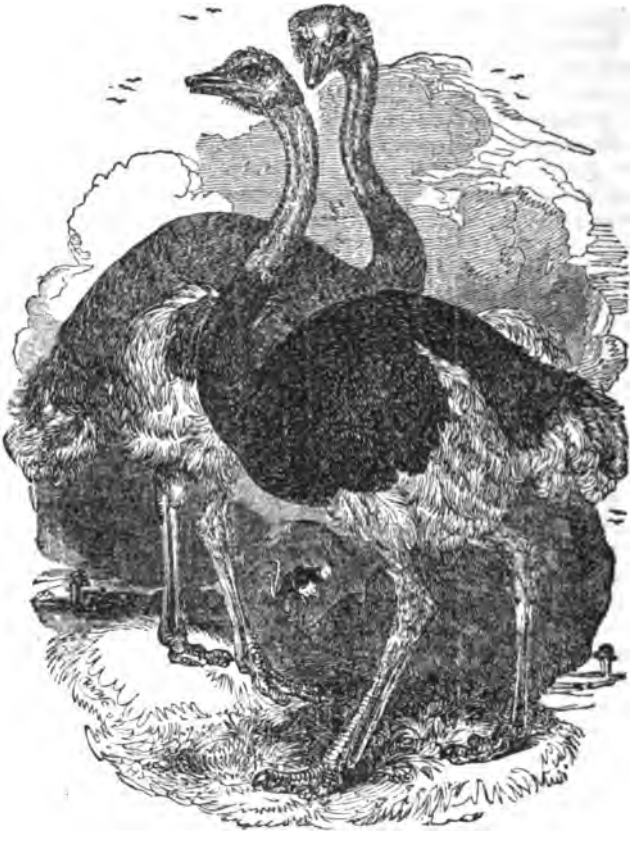
BIRDS.

THE OSTRICH.

The African Ostrich is generally from six to eight feet in height. The lower part of the neck of the male, and the whole of its body, are clothed with broad and short feathers of a deep black, intermingled with a few others which are scanty white, and are barely visible except when the plumage is ruffled. In the female, the general color of the feathers is of a grayish or ashy-brown, slightly fringed with white. In both sexes the large plumes of the wings and tail are beautifully white. The bill is of the color of horn, becoming blackish towards the point. The iris is deep hazel. On the head and neck the hair-down is clear white. In the young bird, these parts, as well as the muscles of the legs, are covered, like the rest of the body, with ash-colored feathers, which fall off after the first year and are not again produced.

The character of the ostrich, like that of other granivorous birds, is extremely mild. It never makes use of its great muscular power to attack, and rarely even in its own defence. It generally has recourse to flight, as its most effectual security against danger; and were its intelligence equal to its velocity, this resource would seldom fail of success. The chase of these birds is accounted one of the most skilful and difficult exercises both for the Arab and his horse, requiring at once the most unwearied patience, and the most reckless impetuosity. The former is absolutely necessary in order to keep them within sight, and to watch their motions, as they wheel round in a circle of greater or less extent, and the latter to seize the favorable opportunity of dashing down upon them in their course and disabling them, which is generally effected by means of a stick thrown with dexterity between their legs. A chase of this kind will frequently last from eight to ten hours. When taken they evince no ill-humor, and after a time become in some degree docile, suffering themselves to be mounted and ridden like horses. M. Adanson, who had several times witnessed this spectacle in Senegal, declares that even when mounted by two men, they outstripped in speed an excellent English horse. In running they always expand their wings, not, as has been erroneously imagined, to catch the wind in order to assist them in their flight, for they do it indifferently, whether running with or against the wind, but in all probability to counterbalance their great height by the extension of these lateral appendages.

Their natural food consists entirely of vegetable substances, and more especially of seeds and the various kinds of grain, in pursuit of which they frequently commit the greatest devastations among the crops in cultivated countries. But so obtuse is the sense of taste in this bird, that it swallows with the utmost



The Ostrich.

indifference, sometimes even with greediness, whatever comes in its way, whether of animal or mineral origin, partly for the purpose, as it should seem, of distending its stomach, and partly also to assist, like the gravel in the crops of our common poultry, in the trituration of its food. Its fondness for the metals in particular was early remarked, and obtained for it the epithet of "the iron-eating ostrich." Popular credulity even went so far as to assign to it the power of digesting these substances, and many are the allusions in our older writers to this fancied property.

Although the ostriches live together in large herds, the received opinion among naturalists is, that the males attach themselves to a single female. There is some difficulty in determining the number of eggs laid by the latter; some travellers estimating it as high as eighty, while others reduce it to ten. Of this latter opinion was Le Vaillant, whose authority is decidedly entitled to the highest respect on every subject connected with the habits of birds, which he studied in a state of nature with the scrutinizing eye of a philosopher, and the patient zeal of a scientific observer. He relates, however, a circumstance which once fell under his own observation, and which tends, in some measure, to

reconcile these discordant statements, while at the same time it renders it questionable whether the ostrich is not, occasionally at least, polygamous. Having disturbed a female from a nest containing thirty-eight eggs of unequal size, and having thirteen others scattered around it, he concealed himself at a short distance, and observed during the day no less than four females successively taking part in the maternal office. Towards the close of the evening a male also took his share of the duty; and Le Vaillant remarks, that he has frequently had opportunities of verifying the fact that the male bird sits as well as the female. In this case it would appear probable that several females had deposited their eggs in one common nest. The extraordinary number of eggs said to have been sometimes found may also perhaps be accounted for by the fondness of the natives for these delicacies, which they abstract from the nest by means of a long stick, cautiously avoiding to introduce their hands, which they affirm would infallibly drive the bird to abandon the place. The ostrich naturally continues laying, in order to complete her usual number; and in this way forty or fifty eggs may actually have been obtained from a single female.

Within the torrid zone the eggs are merely laid in the warm sand, the female sometimes sitting upon them during the night; but in general the rays of the sun are sufficiently powerful to hatch them without any assistance on her part. She does not, however, as has been commonly stated, neglect her offspring, but watches over them with as much solicitude as any other bird, hovering around the spot in which they are deposited, and if surprised in her occupation, making a short circuit, and constantly running to the object of her care. This doubling kind of flight is regarded by the hunters as a certain sign of the vicinity of her eggs, as at all other times the ostriches pursue, for a time at least, a direct and straightforward course. In the more temperate regions, and especially in the neighborhood of the Cape, the ostrich sits like other birds, always choosing the most retired and solitary places. Her nest consists merely of a pit of about three feet in diameter, dug in the sand, which is thrown up around it so as to form an elevated margin. At some little distance are usually placed, each in a separate cavity in the sand, a number of rejected eggs, which are said to be intended to serve as nutriment for the young brood as soon as hatched; a most remarkable instance of foresight, if truly stated, but not yet confirmed beyond the possibility of doubt.

THE EMEU.

In the vocabulary of the early Portuguese navigators, the name of Emeu was applied to a gigantic bird of the ostrich family, inhabiting the peninsula of Malacca and the great chain of islands to the south and east. This denomination has, however, been long superseded by that of cassowary, derived from its native Malayan appellation. On the other hand, the bird now before us was named by naturalists, on its first discovery, the New Holland cassowary, to indicate its close affinity to the Asiatic species. But the colonists of New South Wales having adopted for the Australian bird the name of emeu, now no longer otherwise appropriated, and naturalists in general having of late years sanctioned this transfer of an abandoned title, there can be no objection to its retention, and no risk of any future confusion in the synonyme arising from the change.

The characters of this genus, which may now be regarded as firmly established, are as follows:—It has a straight bill, very much depressed toward the

The Emeu.

sides, slightly keeled along its middle, and rounded at the point; large nostrils, covered by a membrane, and opening above on the middle of the bill; a head unsurmounted by a bony crest, and covered with feathers up to a certain age; a naked throat without wattles; powerful legs of considerable length, fleshy and feathered down to the joint, naked and reticulated below it; three toes directed forward, the two lateral ones equal in length, and the posterior wholly wanting; the claws of all the toes nearly equal; and no true quill-feathers either to the wings or tail. It is consequently distinguished from the African ostrich by the number of its toes; from it and the rhea by the trifling development of its wings, and the total want of plumage to the wings and tail; and from the cassowary by the absence of crest, wattles, and quills, the depression of its bill, the position of its nostrils, and the equality of its claws.

In size and bulk the emeu is exceeded by the African ostrich alone. It is stated by travellers to attain a height of more than seven feet, and its average measurement in captivity may be estimated at between five and six. In form, it closely resembles the ostrich, but is lower on the legs, shorter in the neck, and of a more thickset and clumsy make. At a distance its feathers have more of the appearance of hair than of plumage, their barbs being all loose and separate. As in the other ostriches, they take their origin by pairs from the same shaft. Their general color is a dull-brown, mottled with dirty gray, the latter prevailing more particularly on the under surface of the bird. On the head and neck they become gradually shorter, assume still more completely the appear-

ance of hairs, are so thinly scattered over the forepart of the throat and around the ears, that the skin, which is of a purplish hue, is distinctly visible. This appearance is most remarkable in the older birds, in which these parts are left nearly bare. The wings are so extremely small as to be quite invisible when applied to the surface of the body. They are clothed with feathers exactly similar to those of the back, which, it should be observed, divide as it were from a middle line, and fall gracefully over on either side. The color of the bill and legs is of a dusky-black; and that of the iris dull-brown.

These birds appear to be widely spread over the southern part of the continent of New Holland and the neighboring islands; but we are not aware that they have been hitherto discovered in its tropical regions. They were formerly very abundant in the neighborhood of Botany Bay and Port Jackson, but have been of late years compelled by the increasing numbers of the settlers to seek shelter in the interior. On the south coast they have been met with in great plenty, at Port Philip by Captain Flinders, and at King George's Sound by the same officer and the naturalists of the expedition under D'Entrecasteaux. They seem also to be extremely numerous in the adjacent islands, especially in Kangaroo Island, where they were found in the greatest abundance by both Flinders and Peron; and in King's Island, where the distinguished naturalist last named and his companions were fortunately enabled, by the kindness of some English seal-hunters, to subsist, chiefly upon emeu's flesh, for several days while temporarily deserted by their captain. According to the late accounts from Swan river, they have also been observed on that part of the west coast on which the new settlement is situated.

LAMMERGEYER, OR VULTURE OF THE ALPS.

[See page 240.]

This bird is one of the largest of the feathered race, and one of the most remarkable of the class to which it belongs. Vultures are nearly allied to the eagles in point of size and some of their habits; they yet differ from them considerably in others: generally speaking, they may be easily distinguished by the head and part of the neck being either quite naked or covered with a short down. Instead of ranging over hill and valley in pursuit of living game, they confine their search to dead and putrefying carcasses, which they prefer; and justly merit, by the voracity with which they devour the most offensive carrion, the name of scavengers, in some countries, where they are never destroyed, in consequence of the good they do, by consuming the bodies of animals that might, but for the assistance of the vultures, breed a pestilence in the hot climates where they most abound. A traveller in Africa, having killed two buffaloes, and directed his party to cut them up piecemeal, and hang the various joints on the branches round their tents, that they might be dried up under the scorching beams of a burning sun, found himself suddenly surrounded by a flight of these birds, who actually carried off the flesh, notwithstanding the efforts made to drive away or destroy them by shouting, throwing, and even shooting at them. As fast as one dropped, others supplied his place. Another English traveller, who marched for some days with an army in Abyssinia, in a different part of Africa, speaks of their numbers as to be compared to the sand of the sea, extending over the troops like a black cloud; they were also more courageous than some other species, for he once saw one strike an eagle to the ground,

LAMMERGEYER, OR VULTURE OF THE ALPS.

which had accidentally straggled into a host of vultures, assembled to feed on the dead soon after a battle.

They are, however, sometimes more dainty in their choice of food; as in Egypt, where, during the season when crocodiles and alligators lay their eggs in the sand, these cunning birds will sit, hid in the leaves of the trees, watching the females coming on shore to lay their eggs, which, when laid, they cover carefully with sand, thinking, no doubt, that they are thus safe from all danger, and sure to be hatched in regular course of time, by the warmth of the soil, heated as it is by the sun; but no sooner does she retire, than the concealed birds glide down, and with claws, wings, and beak, tear away the sand, and quickly devour the hidden treasures.

Naturalists are a good deal divided as to the faculty by which these birds are enabled to discover, in a most surprising manner, a dead or dying animal at the distance of even many miles.

In travelling over the immensely wide deserts of Africa, where there is not a blade of grass to tempt a living bird or animal, and no inducement, therefore, for birds of prey to scour those vast wildernesses in search of game, should a camel or other beast of burden drop under its load, in the train of a caravan, in less than half an hour there will be seen, high in the air, a number of the smallest specks, moving slowly round in circles, and gradually growing larger and larger as they descend in spiral windings toward the earth; these are the vultures, but whence they come, or by what sign, or call, they are collected at a height beyond the reach of the human eye, is still a mystery; though we are much inclined to suspect that they derive their information from an inconceivable keenness of sight, rather than, as some suppose, from an extraordinary sense of smelling, which has been attributed to them. When within a few yards, the spiral motion is changed for a direct line, they then alight on the body, and tearing it in pieces, feed upon it with greediness.

Some idea, indeed, may be formed of their voracity, when we are assured that, at one meal, a vulture contrived to devour the whole body, bones and all, of an albatross.

THE CONDOR.

[See page 242.]

The Condor is one of the largest of the rapacious birds. In size it is little, if at all, superior to the bearded griffin, the lammergeyer of the Alps, with which Buffon was disposed conjecturally to confound it, but to which it bears at most but a distant relation. The greatest authentic measurement scarcely carries the extent of its wings beyond fourteen feet, and it appears rarely to attain so gigantic a size. M. Humboldt met with none that exceeded nine feet, and was assured by many credible inhabitants of the province of Quito that they had never shot any that measured more than eleven. The length of a male specimen somewhat less than nine feet in expanse was three feet three inches from the tip of the beak to the extremity of the tail; and its height, when perching, with the neck partly withdrawn, two feet eight inches. Its beak was two inches and three quarters in length, and an inch and a quarter in depth when closed.

The beak of the condor is straight at the base, but the upper mandible becomes arched toward the point, and terminates in a strong and well-curved hook. The basal half is of an ash-brown, and the remaining portion toward the point is nearly white. The head and neck are bare of feathers, and covered with a

THE CONDOR.

hard, wrinkled, dusky reddish skin, on which are scattered some short brown or blackish hairs. On the top of the head, which is much flattened above, and extending some distance along the beak, is attached an oblong firm carunacle or comb, covered by a continuation of the skin which invests the head. The organ is peculiar to the male. It is connected to the beak only in its anterior part, and is separated from it at the base in such a manner as to allow of a free passage of the air to the large oval nostrils, which are situated beneath it at that part. Behind the eyes, which are somewhat elongated, and not sunk beneath the general surface of the head, the skin of the neck is, as it were, gathered into a series of descending folds, extending obliquely from the back of the head, near the temples, to the under side of the neck, and there connected anteriorly with a lax membrane or wattle, capable of being dilated at pleasure, like that of the common turkey. The neck is marked by numerous deep parallel folds, produced by the habit of retracting the head in which the bird indulges when at rest. In this position scarcely any part of the neck is visible.

Round the lower part of the neck, both sexes, the female as well as the male, are furnished with a broad white ruff of downy feathers, which form the line of separation between the naked skin above and the true feathers covering the body below it. All the other feathers, with the exception of the wing-coverts and the secondary quill-feathers, are of a bright black, generally mingled with a grayish tinge of greater or less intensity. In the female the wing-coverts are blackish-gray; but the male has their points, and frequently as much as half their length, white. The wings of the latter are consequently distinguished from those of the female by their large white patches. The secondary quill-feathers of both sexes are white on the outer side. The tail is short and wedge-shaped. The legs are excessively thick and powerful, and are colored of a bluish-gray, intermingled with whitish streaks. Their elongated toes are united at the base by a loose but very apparent membrane, and are terminated by long black talons of considerable thickness, but very little curved. The hinder toe is much shorter than the rest, and its talon, although more distinctly curved, is equally wanting in strength; a deficiency which renders the foot much less powerful as an organ of prehension than that of any other of the large birds of the Raptorial order.

The condor has been observed throughout the whole range of that immense chain of mountains which traverses the continent of South America, from the straits of Magellan to the seventh degree of north latitude. It appears, however, to be much more common in Peru and Chili than in any other part of the chain, and is most frequently met with at an elevation of from ten to fifteen thousand feet above the level of the ocean. Here, in the regions of perpetual snow, they may be seen grouped together to the number of three or four, but never in the large troops in which the true vultures sometimes assemble, on the bold points of the jutting rocks, many of the most remarkable of which are designated by the natives with names derived from the bird that haunts their pinnacles. It is only when driven by hunger that it descends into the plains, which it quits as soon as its appetite is satisfied, unable, as it would seem, to support for any great length of time the increased weight of the atmosphere and the warmer temperature of the lower world. On such occasions it rarely perches on the branches of the trees, but generally takes up a position on the ground, for resting on which its comparatively straight talons are peculiarly fitted. It is said that the female bird builds no nest, but deposites its eggs upon the bare rock without protection of any kind. These eggs are stated to be perfectly white, and three or four inches in length. The female is also said to remain with her young for a whole year.

The habits of the condor partake of the bold ferocity of the eagle, and of the disgusting filthiness of the vulture. Although, like the latter, it appears to prefer the dead carcass, it frequently makes war upon a living prey; but the gripe of its talons is not sufficiently firm to enable it to carry off its victim through the air. Two of these birds, acting in concert, will frequently attack a puma, a lama, a calf, or even a full-grown cow. They will pursue the poor animal with unwearied pertinacity, lacerating it incessantly with their beaks and talons, until it falls exhausted with fatigue and loss of blood. Then, having first seized upon its tongue, they proceed to tear out its eyes, and commence their feast with these favorite morsels. The intestines form the second course of their banquet, which is usually continued until the birds have gorged themselves so fully as to render themselves incapable of using their wings in flight. The Indians, who are well acquainted with this effect of their voracity, are in the habit of turning it to account for their amusement in the chase. For this purpose they expose the dead body of a horse or a cow, by which some of the condors, which are generally hovering in the air in search of food, are speedily attracted. As soon as the birds have glutted themselves on the carcass, the Indians make their appearance, armed with the lasso, and the condors, being unable to escape by flight, are pursued and caught by means of these singular weapons with the greatest certainty. This sport is a peculiar favorite in the country, where it is held in a degree of estimation second to that of a bullfight alone.

THE EAGLE.

[See pages 245, 247.]

The Falcon genus of birds forms a very extensive division of the diurnal birds of prey. Upward of a hundred and fifty alleged species have been described; but of these many are very little known, and not a few of them are mere varieties resulting from age, sex, or climate. Few of the species assume the adult plumage until three or four years of age; and this circumstance alone has occasioned many mistakes, which cannot be corrected until the law which regulates the change of plumage in every instance has been ascertained. They are chiefly distinguished from the vulture tribe by having the neck and head covered with feathers, and by the prominence of the eye-brows, which gives to the eyes a sunken appearance. The female is, in almost every instance, one third larger than the male.

In the present very unsatisfactory state of the divisions in this genus, we need only state that the eagles form a large section of the genus falcon, and include not only the largest species which belong to it, but the most powerful and courageous of the birds of prey. They have a very strong beak, which is of considerable length, straight at its base, and bent only toward the point. The legs are strong and covered with feathers, even to the ends of the toes, which are armed with powerful and very crooked claws.

We shall confine our attention in the first place to the Great Eagle, under which term we shall consider that there are included the following, which by different naturalists have been set down as distinct species: the common eagle, the royal eagle, the golden eagle, the ring-tailed eagle, the white-tailed eagle, and the black eagle. Recent naturalists are disposed to consider that all these terms apply to the same bird under different circumstances. The male is about three feet long, and the female three feet and a half, the outstretched wings

EAGLE'S NEST.

generally measuring between seven and eight feet; but these dimensions are sometimes exceeded. The female is not only larger, but, in a state of freedom, appears to possess more courage and subtlety than the male.

In a clear sky, the great eagle soars to a vast height, but flies lower in cloudy weather. He rarely quits the mountain to descend into the plains; and whenever this does happen, it is generally in the winter season, as will appear from an examination of the dates at which eagles have been shot or captured in the plain country. His immense muscular power enables him to contend with the most violent winds. Ramond relates that, when he had reached the summit of Mount Perdu, the most elevated point of the Pyrenees, he saw no living creature but an eagle, which passed above him flying with inconceivable rapidity in direct opposition to a furious wind from the southwest. The flight of the great eagle is so high that the bird often ceases to be discernible by the human eye; but even at this distance its cry, which has been compared to the barking of a small dog, can still be heard; and such is the amazing acuteness of its own sight, that, when too high in the air to be visible to man, it can mark out a hare or even a smaller animal that may be upon the ground, and darts down upon it with an unerring aim.

This bird, with its bold glance, proud air, elevated flight, and strength of limb, combined so many of the qualities which are commonly esteemed noble, that he was called by the ancients the "Celestial Bird;" and, in their mythology, was the messenger of Jupiter and the bearer of his thunderbolts. Its figure in gold or silver upon the end of a spear, was the military ensign of the Romans and Persians. Modern potentates have followed the example; and in heraldry, the figure of the eagle has been adopted as the emblem of power.

The great eagle, although nowhere a common bird, is very extensively diffused over the world, being found in the mountainous regions of Europe, in various parts of Asia, and in Africa (at least in the Atlas chain, for the species which have been met with by travellers generally in that continent have not been well defined); it is also found in North America, where, however, it is even more than ordinarily rare. It likewise appears in the mountains of Great Britain and Ireland, but not so commonly as supposed, because the ospray is often mistaken for it by common observers. It is of importance that when an eagle happens to be shot it should be examined by some neighboring naturalist, in order to determine the species.

Eagles cannot be tamed without great difficulty. European falconers stigmatized them as "ignoble," because they could not train them to assist in field-sports like the hawks, or "noble falcons." The Tartars, however, have been able to effect this; they take the eagles young, and train them to assist in the chase of hares, foxes, antelopes, and even wolves. Perhaps, however, the bird thus employed, which travellers call an eagle, is only a species of hawk, like the *cherkh*, which is similarly employed in Persia. A pamphlet was, some years ago, published by Professor Reisner of Germany, with the object of showing that eagles might be employed to direct balloons. He states the number of birds which would be necessary, according to the dimensions of the machine, and gives directions for the mode in which they should be harnessed, trained, and guided.

The peregrine falcon (*Falco peregrinus*) is the falcon *par excellence*, because, though perhaps not the most powerful, it was the most generally in use, and also one of the most elegant. The length of the female is about sixteen or seventeen inches, and the extent of the wings an inch or two more than three feet. The bill is bluish black, yellowish at the base; gape and cere yellow. The whole upper parts of the plumage dusky black, with a cinereous dash;

PEREGRINE FALCON.

the shafts of the feathers black, and the margins slightly edged with ferruginous brown; the forehead pale; the sides of the neck and back mixed with yellowish white; a black patch behind the eye; from the corner of the mouth a broad black streak pointing downward; chin ferruginous white; the whole of the under parts the same, with a broad streak of dusky black down the shafts, less conspicuous on the throat and vent; under and upper tail coverts barred with dusky and ferruginous white, the former dashed with cinereous; quill feathers dusky black dashed with cinereous; the inner webs with transverse oblong spots of ferruginous white; the under coverts of the wings alternately barred with black and white. Tail dusky black, dashed with cinereous, with eight pale ferruginous bars, least conspicuous on the outer webs of the exterior feathers; one of the bars constitutes the extremity. The bill and talons of this species are remarkably strong, the former being much hooked, and furnished with a toothlike process on each side of the upper mandible, which enables it to cut and tear its prey with greater ease. The wings are very pointed, the second feather being the longest, the first not much inferior, and the tail short, so that the wings when closed reach very near the end. The legs short, strong, and pale yellow; the toes long, and furnished with a projecting callus beneath at the second joint.

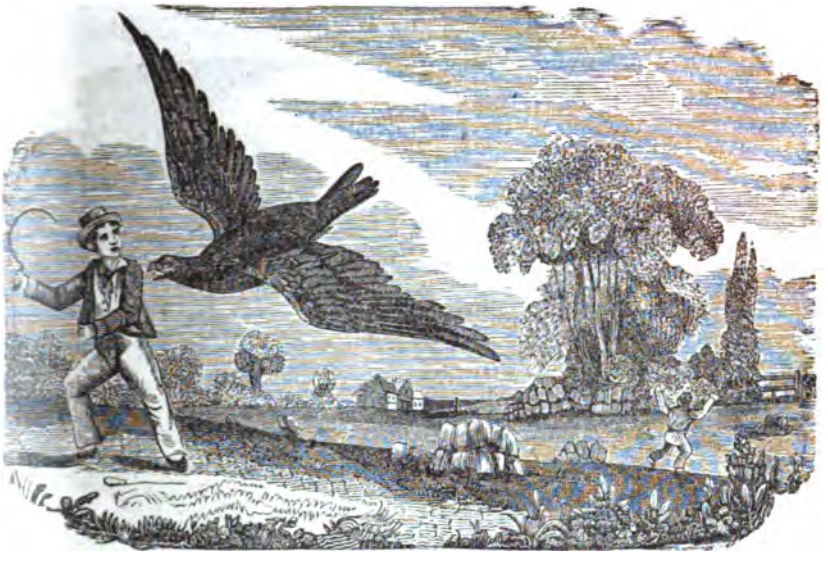
Though most abundant in the hilly parts of the temperate regions of the world, the peregrine falcon, from the vigor of its flight, is occasionally seen in all parts of the world, at least of the eastern hemisphere; and indeed the range from the middle of Europe to that of Africa is only a morning's flight for it. It is also as long-lived as it is fleet and discursive. One is mentioned as having been met with in Southern Africa, in the year 1793, wearing a gold collar dated 1610, and known at that time to have belonged to James I. king of England; though more than one hundred and eighty years old, it was still in complete vigor.

The peregrine falcon inhabits all the temperate and colder parts of Europe, ranging from Iceland to the islands of the Mediterranean, frequenting high and rocky mountains, and building its nest, about the end of February, in precipitous cliffs, with a southern aspect. The eggs are generally three or four in number, white and spotted with brown. It is rarely met with in champaign countries, and never in those of a marshy description. In Germany and France it abounds, is pretty common in Holland and England, but is seldom met with in Switzerland. There is scarcely any part of the English coasts, from north to south, where the cliffs rise to three or four hundred feet, in which they are not found. We may also remark that they are very courageous birds, darting suddenly, perpendicularly, and with great rapidity, on their prey, which principally consists of partridges, pheasants, quails, wood-pigeons, &c., and the smaller quadrupeds. They also attack the kite, and compel it to relinquish its victim, but spare its life, as if in contempt of such a dastardly adversary.

They have also been known to attack and carry off children.

Bishop Heber, in his travels in India, passed through a mountainous district, where sad complaints were made of their carrying off infant children; and we remember some years ago, in the Alps, that on a high-pointed pinnacle of inaccessible rock, jutting out from a peak of snow, near the summit of the Jung Frau, one of the highest of the Alpine range of mountains, there might be seen the tattered remains of the clothing of a poor child, who had been carried up by a lammergeyer, or bearded vulture, from a valley below, in spite of the shouts of some peasants who saw the bird pounce upon its prize.

A more fortunate fate awaited a child in the isle of Skye in Scotland, where a woman having left it in the field for a short time, an eagle carried it off in its

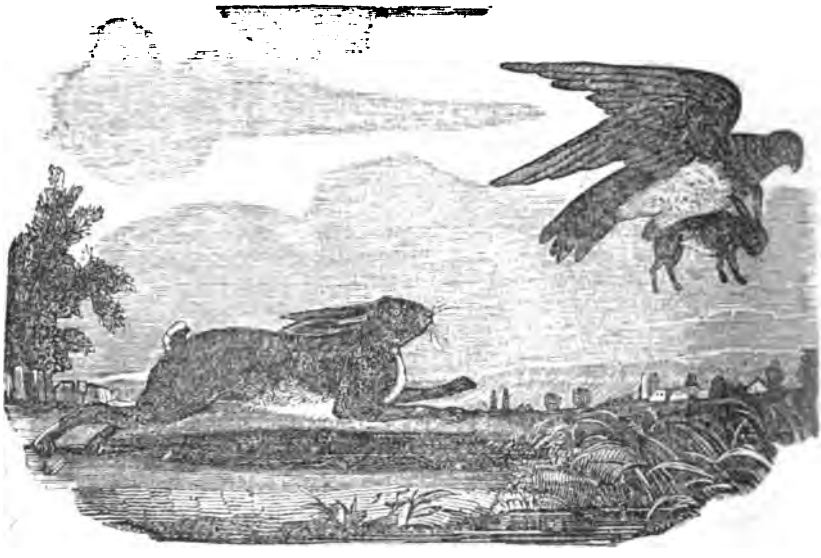


Contest between a Boy and an Eagle

talons across a lake, and there deposited its burden; some people herding sheep perceived it, and hearing the infant cry, hurried to the spot, and found it uninjured. The name of the child was Niel, but he was afterward distinguished and called by a Gaelic word, signifying eagle. In Sweden, a deplorable circumstance occurred to the mother of a child; she was working in the fields, and had laid her infant on the ground, at a little distance; soon after an eagle darted down and carried it off. For a considerable time the wretched woman heard the poor child screaming in the air; but there was no help. She saw it no more; in a little time she lost her reason, and is, we believe, still living, confined in the lunatic asylum of the town near which it happened.

On Tirst Holm, one of the Ferroe islands, situated between the north of Scotland and Iceland, a similar fact occurred; an eagle caught up an infant lying at a little distance from its mother, and carried it to its nest, situated on a point of a high rock, so steep that the boldest bird-catchers had never ventured to attempt to climb it; the mother, however, ascended, and reached the nest, but, alas! too late: the child was dead, and its eyes torn out.

But the most striking story we have met with, is the brave behavior of a little boy in the State of New York. Two boys, the one seven, and the other five years old, were amusing themselves by trying to reap, while their parents were at dinner. A large eagle soon came sailing over them, and with a sudden sweep attempted to seize the eldest, but luckily missed him. The bird, not at all dismayed, alighted at a short distance, and in a few moments repeated his attempt. The bold little fellow, however, gallantly defended himself with the sickle, which he fortunately held in his hand, and when the bird rushed upon him, resolutely struck at it. The sickle entered under the left wing, and the blow having been given strongly, went through the ribs, and piercing the liver proved fatal. On opening the bird's stomach, it was found entirely empty, which may explain in some degree the cause of so unusual an attack. The brave little boy



Hawk carrying off a Leveret.

did not receive a scratch, though there can be little doubt, that had the bird not been weakened by hunger, a blow or two from its sharp strong beak would have penetrated through the scull into the brain, and caused instant death.

The immense power of wing of the rapacious birds, however, is more decidedly shown by the fact of so small a bird as the kestrel, weighing only six ounces and a half, and having an expansion of wing of only twenty-seven inches, having been known to dart upon a weasel, an animal its equal, nearly, in size, and actually mount aloft with it. As in the case of the eagle, it suffered for its temerity, for it had not proceeded far, when both were observed to fall from a considerable height. The weasel ran off unhurt, but the kestrel was found to have been killed by a bite in the throat.

The following is a strong corroboration of the truth of the story just mentioned, as far as the powers of a hawk to raise comparatively heavy weights, but is more curious, as exhibiting the courage displayed in one of the most timid animals in defence of its young. It occurred in Yorkshire. In the spring a gentleman walking in the fields saw a small hawk, attempting to fly off with some prey it had just pounced upon, but evidently prevented by the weight of its capture from rising to any height above the ground. It was pursued by a hare, which, whenever it came within her reach, attacked it with her paws, and at last succeeded in knocking it down, when it dropped its prey. At this moment, the gentleman ran forward, and the hawk and its pursuer both made their retreat; upon his reaching the spot where the prey had been dropped, he found it to be a fine leveret, which at once explained the cause of the parent hare's gallant attack on the hawk. It was wounded on the side of the head, and was bleeding, but the gentleman left it in a furrow, hoping that the wound might not prove fatal, and that the mother might find it and reap the reward of her maternal attachment.

It may seem extraordinary that they should presume to meddle with living things of their own size and weight, but it is still more remarkable that they

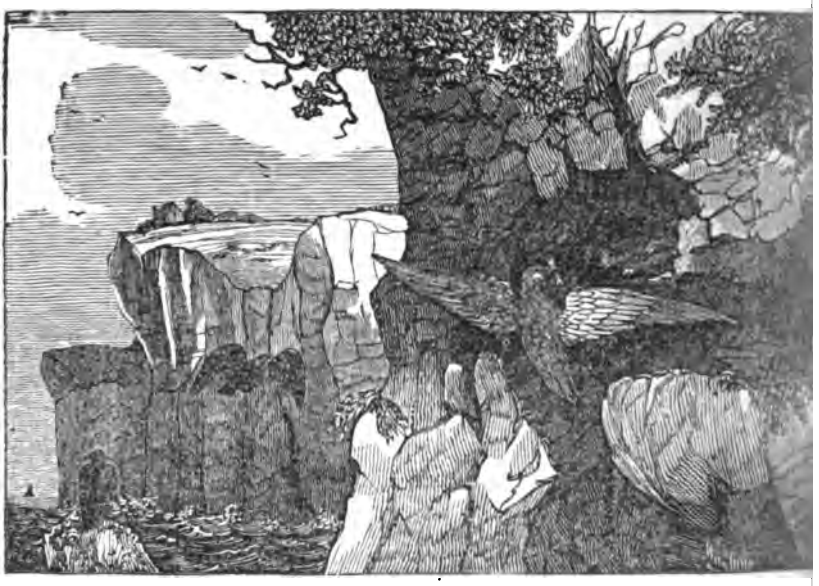
ould occasionally wage successful warfare with birds still larger than themselves, as for instance with the jay. Not long ago, some boys observed a hawk ing after a jay, which, on reaching, it immediately attacked, and both fell on outside-field, where the contest appeared to be carried on; the boys hastened but too late to save the poor jay, which was at the last gasp; in the agonies death, however, it had contrived to twist and entangle its claws so firmly in hawk's feathers, that the latter, unable to escape, was carried off by the ys, who brought it home, when on examination it proved to be a kestrel. e sparrow-hawk of North America, (*Falco sparverius*,) which is more nearly ed to the kestrel than that of England, is often known to attack the bluejay of d country. No wonder that jays have a great dislike to this hawk, and never to annoy it by every means in their power. Sometimes they will follow in ed to plague it; at other times, they, by imitating his note, will deceive and e a mean no lessons. In return for all this abuse, the hawk now and then ges itself by killing and eating the fattest of its persecutors.

SEA-EAGLE.

THE engraving represents the bird of Washington feeding its young. This d, sometimes called the great sea-eagle, is considered by Mr. Audubon to be finest bird of this genus; he therefore named it the bird of Washington. e great sea-eagle, or bird of Washington, is very rare, confining itself usually lonely situations; occasionally, however, it follows the hunters, to feed on e entrails of the animals they kill, when excluded by ice from its favorite ter-haunts, where in open weather it dives for fish.

A naturalist, who was extremely anxious to meet with one, had long labored vain, when one day, as he was engaged in collecting cray-fish near the o river, he chanced to observe on the rocks, which at that place were ndy perpendicular, a quantity of white droppings, which led him to conclude e owls resorted thither; but, having been assured by a more experienced pectator that they must have fallen from a nest of one of the long-looked birds of Washington, and that the old ones caught fish on the river, he termined to watch for them, and in high expectation seated himself, with friend, about a hundred yards from the foot of the rock. For two long urs he waited with great impatience and curiosity, when the approach of the agles was announced by loud hissings, which he soon perceived to be ered by two young ones crawling from the extremity of their hole, to receive e fish presented by the parent, as it held itself to the projecting rock, somewhat after the manner of a house swallow, its tail spread out, and its wings ly as. That they might not be observed, or frighten the birds away, they ched down, and kept perfect silence, not whispering a single word. In a minutes the other parent joined its mate; it also had brought a fish, but ing not so bold, or more suspicious, before it ventured to alight, it glanced its and piercing eye around, and instantly catching sight of the spectators, ped the prey, and with a loud shriek communicated its alarm to the other, ch, leaving its hold, hovered over their heads, keeping up a sort of growling ntering cry of intimidation.

At the same moment, the young birds, as if aware of some danger, shrunk k, and buried themselves in the chink of the rock; and, as further waiting had been unavailing, the observers went to the bottom of the precipice, d picked up the fish that had fallen; it proved to be a sort of large perch,



Great Sea-Eagle, or Bird of Washington, feeding its Young.

weighing about five pounds and a half; the upper part of the head was broken in, and the back much torn by the talons of the eagle. The sport being over, as they journeyed home, they agreed to return, and endeavor to procure both the old and young birds, either dead or alive.

Accordingly, on the third day following, they assembled with some additional hands, well provided with guns, and materials for ensuring success, and proceeded to post themselves, some at the foot and some at the top of the rock; but all in vain. The eagles had been beforehand, and proved too cunning for them. The young birds had disappeared, and they passed the whole day without seeing or hearing any thing either of them or the old ones. It appeared from their observations, that the old ones had actually removed their young to fresh quarters, but as they did not seem sufficiently grown to use their wings, how they could accomplish such a removal, was a mystery not to be solved.

Two years afterward, the same person was fortunate enough to shoot one dead on the spot, as it sat upon a low tree, attracted, as was supposed, by the scent of some slaughtered hogs. The bird in this case seemed to be perfectly fearless, not only allowing the sportsman to approach within easy gunshot distance, but looking at him all the time with an undaunted eye.

Having had, since first seeing one of this species, other opportunities of observing their habits, he has given some very interesting details. In its flight it differs from another sort of eagle for which it is often taken; when looking after fish in the water below, it makes very wide circles, and when it sees one, it falls gradually in a circuitous, spiral manner, as if with an intention of checking any retreating movement of its prey. When within a few yards, however, it darts down like a shot, and seldom misses its object. As it is so constantly exposed to the water, its feathers are provided with a greater portion of that oily substance common to many birds, and they shine as if covered with a thin

ating of clear gum. An anecdote is related by Dr. Richardson, who accom-
panied that enterprising traveller, Sir John Franklin, as current on the plains of
Saskatchewan in North America, of a half-breed Indian, who was vaunting his
prowess before a band of his countrymen, and wishing to impress them with a
proof of his supernatural power. In the midst of his harangue, an eagle was
observed suspended as it were in the air directly over his head; upon which,
raising aloft with his dagger, which glistened brightly in the sun, he called
upon the royal bird to come down. To his own amazement, no less than to
the consternation of the surrounding Indians, the eagle seemed to obey the
mandate, for instantly shooting down with the velocity of an arrow, it impaled
itself on the point of his weapon.

COMBATANTS.

(See page 254.)

The name of Combatant is given by the majority of naturalists to the bird
represented in our engraving, because of its fighting character. As the females
of this species rarely share in the struggles which the males enter upon, some
writers suppose that love alone—a sort of chivalric gallantry—is the cause of
the warlike humor of these birds. This, however, is incorrect.

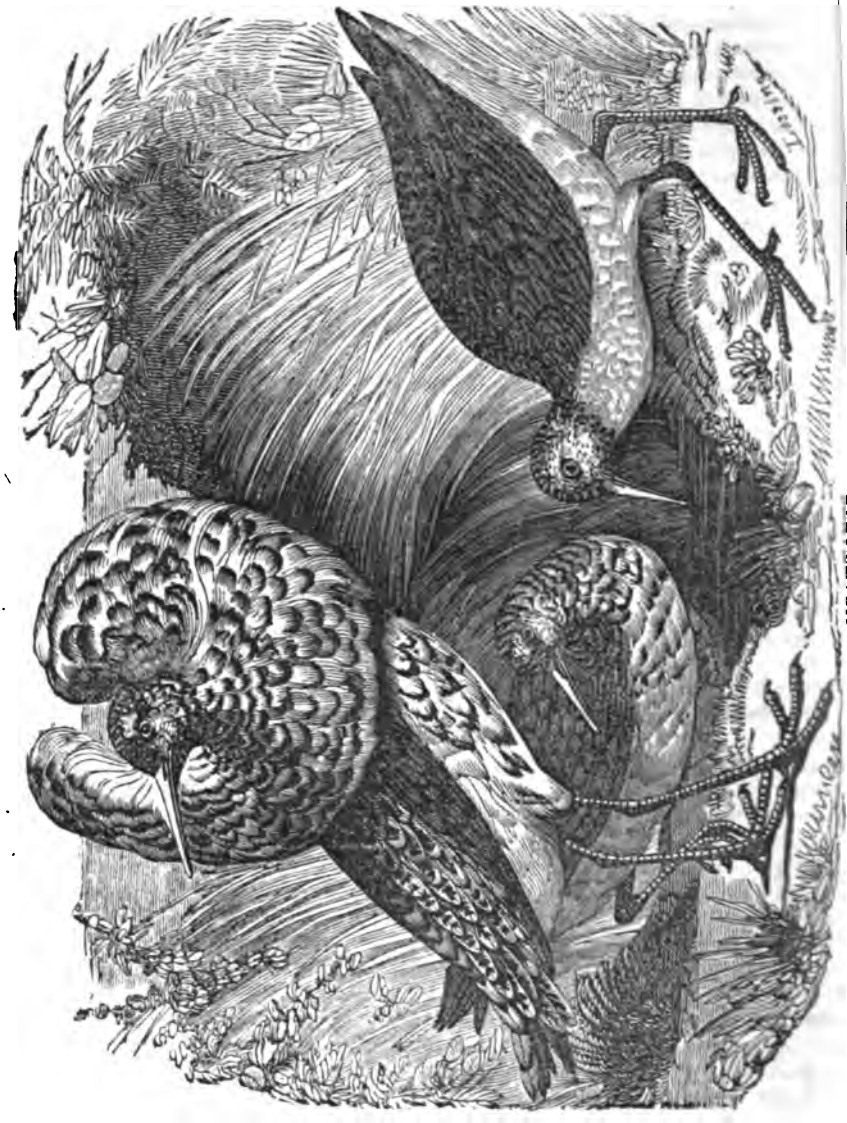
In the months of April and May, this propensity of the male combatants is
more strongly exhibited than at any other period of the year. The assaults are
often commenced by two individuals, which generally operates as a signal for
the whole troop to join in the mêlée. These affrays are more frequent and
severe in the morning and at evening, although they often commence a fight
during the day, none of which ever terminate without spilling some blood. The
spectator females are never on the battle-ground during the contest, but, by their
cries they increase the ardor of the rivals; and when the vanquished are put
to flight, they pay homage to the victors by obsequious caresses. The females
frequently resume their cries, by which the fugitives are instantly reanimated
with fresh courage, and renewed the arms against new champions with an ardor
that seems always the same.

At this period of the spring, when the ebullition of feeling is strong, the
male combatants have a kind of collar or necklace which serves as defensive
armor and a dress of which they seem proud. This collar is composed of long
feathers, strong and thickly set, which may be bristled up in a moment when
the bird is angry or is preparing for combat. These feathers are ordinarily shed
about the first of June.

The color and form of the necklace vary in different individuals, during the
whole period of its growth. With some, the color is red, others brown, others
a mixture, and in some a fine dark violet sometimes tipped with red spots.
Occasionally one is seen with a collar entirely white. It may be remarked
that at this particular season the head is divested of feathers and covered with
small bloody tubercles, in infinite numbers, extending from the eyes to the top
of the head and adjacent parts.

It is with great difficulty that the males and females can be distinguished at
any other season than this period of great irritability. Then the collar and
tubercles are distinguishing characteristics; but when the feathers forming the
collar are shed, small feathers take the place of the tubercles upon the head,
and male and female appear alike.

We have said that love is not the cause of the warlike disposition of the



COMBATTANTS.

combatants. This effect is produced by a more trifling motive. When put upon the corner of a spot of green turf, on which is scattered a little food, the presence of spectators will excite a combat, and this seems to be their only subject for rivalry. The females are oftentimes in a quarrelsome humor, and are then more redoutable than the males.

The combatants are quite common in Sweden, Iceland, Russia, and Siberia, and some of the mountainous regions of southern Europe. In the spring they migrate southward, and arrive in Holland and France in April, and proceeding onward to England, they there collect in great numbers in the month of May, especially in Lincolnshire, where they build nests and rear their young. Their nests are made in small holes in the ground, among green grass, or near the margin of a morass. The eggs are of an ash color, spotted with reddish brown, and are highly esteemed for food. During the summer season the flesh of this bird is sought for, as a delicate morsel. The bird-catchers insnare them during their general battles. The plumage of the combatants is various, especially among the males. Their size, ordinarily, is ten or eleven inches in height.

COTINGA AMPELIS.

[See page 256.]

The Cotinga is a genus of American birds, belonging to the fly-catching tribe of the dentirostral division of Cuvier's great order *Passeres*, and ranged between the fly-catchers properly so called and the bee-eaters. These birds were ranged by the elder ornithologists, along with many others, in a very extensive genus, but they have been since sub-divided. The cotingas, properly so called, all inhabit the rich and humid forests of America. They are conspicuous for the rich colors of their plumage, in which purple and blue are the prevailing tints.

The characters are:—the bill of mean length, a little depressed, higher than wide, three cornered at its base, flattened at its point, moderately hard; upper mandible convex, with a ridge on the culmen, and notched toward the point, which is curved; the inferior mandible a little flattened on the under side; nostrils at the sides of the base, round, half closed with membrane and by some silky feathers; feet of mean size, three toes to the front, one behind; the two outside, in front, united to the second; and the hind toe the same length as the outer one; wings rather short, the first quill shorter than the second, which is the longest in the wing.

As restricted by Cuvier, the genus *Cotinga* is a very peculiar one, and does not contain a very great number of species. The birds which compose it are all of a wild and retiring character, shy and silent, having nothing in their conduct or their sounds at all corresponding to the brightness of their covering. They are found only at those parts of America which have a strictly tropical climate, and even in these they are confined to moist and shady situations which abound with insects, though they are also understood to live, in part, upon soft and sugary fruits. They are not, however, so destructive to plantations as many other birds that have the same mode of feeding; but though they are retiring, and also confined within geographical limits, they are not absolutely stationary; yet, the only object of their little voyage is, to arrive in certain places at the epoch in which the fruits they subsist on are mature. In Guiana, the spots in which they most delight, in those seasons when they are seen near

COTINGA AMPELIS.

habitations, are humid places. It is an error to suppose that they are destructive to the rice grounds. From the peculiar conformation and absence of solidity in their bill, it is impossible that they can be granivorous birds. According to Sonnini, the inhabitants do not eat their flesh, and if the stuffed specimens often arrive in Europe in a bad state, this is not the reason; it is rather, because the feathers not being very adherent, the tender skin requires a degree of care in its preparation, which is not always bestowed upon it in America. The size of the cotinga varies from that of the raven to that of the song thrush. The colors of the females are, in general, much less rich than those of the males; their plumage is, indeed, frequently dull and dusky. The habits of these birds, and the facts concerning their reproduction, are very imperfectly known; many species, however, are known to make their nests on the loftiest trees, and lay four or five eggs.

As the same parts of the forests in which these birds nestle, are inhabited by climbing quadrupeds, which are much disposed to plunder both eggs and young, the birds take the precaution of building at heights, and under circumstances of concealment which make their broods pretty safe, not only from quadruped enemies, but from nest-plundering birds, of which there are many species in the luxurious forests of tropical America. Thus, the cotingas, in their quiet way, contrive to get on as well in their domestic economy as the most noisy tenants of the forest. Their general history is a short one: they live in the very richest places of the world, feed well, wear handsome clothing, dwell in secure habitations, and take as little fatigue as they possibly can.

HORNBILLS.

[See page 256.]

Like the ravens and vultures, these birds perform the part of scavengers in the countries which they inhabit. They abound in South America and Southern Africa, and feed chiefly upon offal and carrion. Le Vaillant saw the coronated species in Caffraria, congregating in flocks of five hundred, along with crows and vultures, over the remains of slaughtered elephants. In the absence of their favorite food, they prey upon frogs, lizards, and insects, and, when hard pressed, pursue small birds and quadrupeds; and have been even known to follow the sportsman, for the purpose of catching the disabled victim of his pleasure.

They are generally of a heavy form, with limited powers of flight. The feature by which they are principally distinguished, and after which they are named, is an enormous toothed bill, surmounted by a singular protuberance, called the casque, or helmet. These organs are so curiously diversified, that each species might almost stand for a distinct genus. In some, the casque bears the form of a simple horn; in others it is double. Several have it turned up at the end, and convoluted in a spiral manner. Some have it flat and broad; others narrow, convex, and ribbed; and in the one we have engraved, it is convex and smooth. The use of these strange appendages is not known; many have conjectured them to be weapons either of offence or defence, but this is not borne out by their internal structure, which is that of a series of light cellular chambers, adhering irregularly together, and covered on the outside with a hard bony shell; nor is it supported by the habits of the bird, which are shy, sluggish, and cowardly. The most probable surmise is, that they subserve the sense of smell in some way with which we are not acquainted, and which a

HIMALAYAN HORNBILL.

number of careful dissections, aided by close observations of the living bird, can alone demonstrate.

The forms of the bill are still further varied according to the age of the bird: a circumstance which has made the identification of the species a work of great labor.

The bills in all the species are long, curved gradually downward from the base, and more or less jagged on the edges. The nostrils are placed behind the base of the bill, and covered by a membrane. The legs, robust and short; the feet, in all the species, covered with scales; the three toes directed forward, almost of equal length, and so nearly united together at the base as almost to form a sole: the hind toe is large and flat, and gives a powerful support to the bird, which, nevertheless, does not move by walking, but by leaping with the feet together. The first three quill-feathers of the wings are graduated, the fourth or fifth being the longest.

The species we have figured is a native of the Himalaya mountains. Its body is about the size of a small goose; the wings short, and its whole structure loose, but powerful. The bill and casque are of a bright yellow, tinged in some places with red; cheeks, back of the head, and neck, white; back, belly, and wings, black; wing-coverts and tips of quills, white; thighs white and tail white, with a black band across the middle.

Mr. Griffiths remarks, that the forms of the bill connect the birds by a close analogy with the toucans, while their port and habits approximate them to the ravens, and their feet to the bee-eaters and king-fishers.

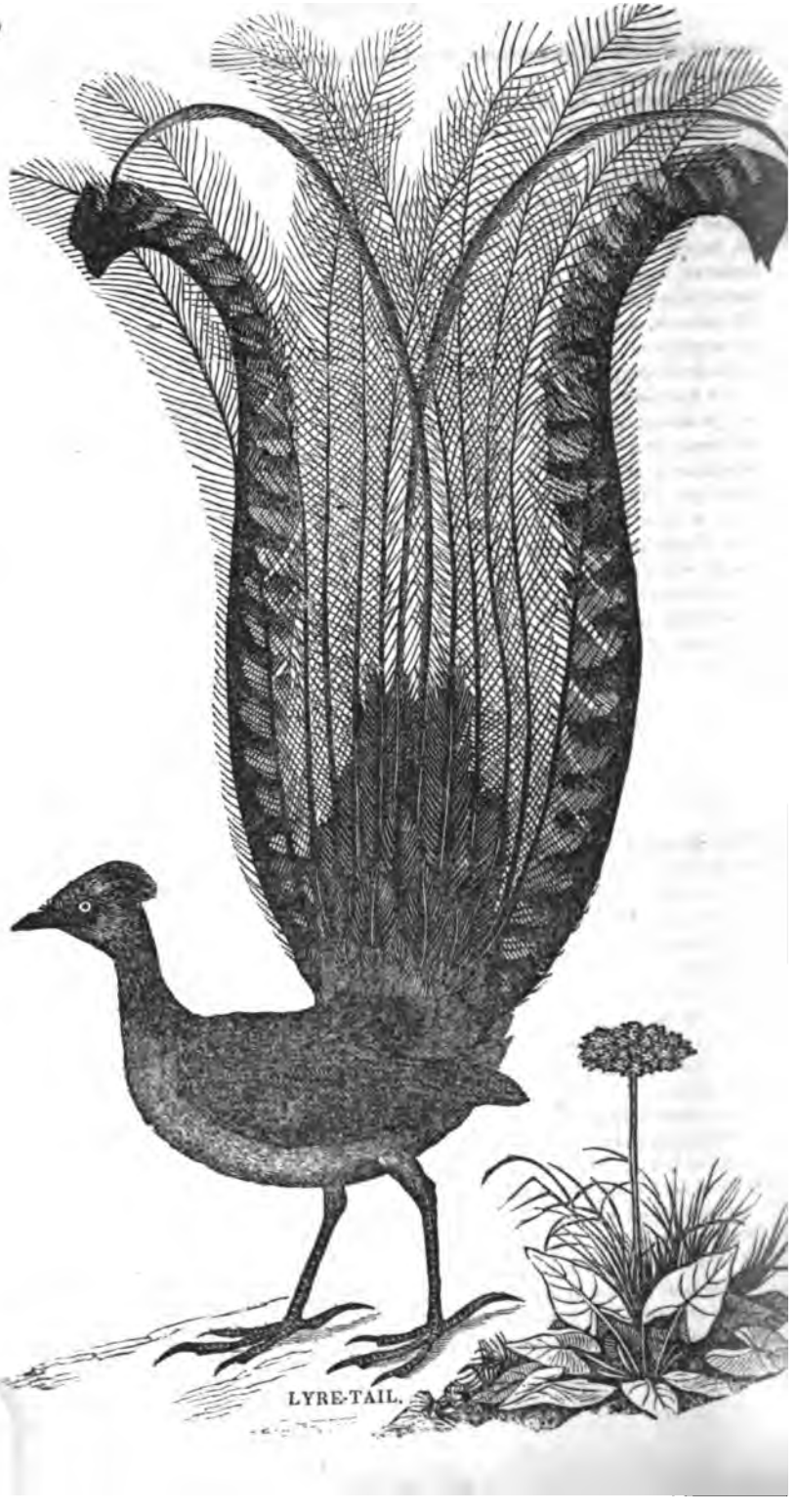
Hornbills associate in large flocks on the tops of high trees, and are particularly fond of dead branches, on which they repose with an air of ludicrous gravity. Naturalists enumerate about twenty-five species.

THE MENURA, OR LYRE-TAIL.

[See page 260.]

The Menura, or Lyre-Tail, is a very remarkable species of bird, a native of New Holland, found only in that country, and being the only one of the genus and even the family, as well as only a single species. It belongs, in Cuvier's arrangement, to the dentirostral family of the great order *Passeres*, with which it agrees in the bill being notched, and also in the general form of the legs and feet. But in its air and gait there are some resemblances to the poultry family, though those resemblances are rather slight. They consist in the prevailing tint of the plumage, the short and rounded wings, and the produced feathers in the tail of the male bird. Very little analogy, however, can be founded upon either of those resemblances, and therefore the bird, as we have said, stands alone.

The characters are: The bill broader than high at the base, and triangular in the section there, like the bills of the thrushes. For the greater part of its length the bill is straight, but the point of the upper mandible is hooked, and furnished with a notch on each side. There is a distinct ridge along the culmen of the bill; and the nostrils are placed in the middle of the bill, in prolonged grooves, very large, oval, and partially covered with membrane, which is beset with feathers as in the bills of the jays. The feet are slender, and the tarsus twice as long as the middle toe. The three front toes are of equal length, the internal one free, but the external joined to the middle as far as the first articulation. The claws are nearly as long as the toes, convex on the upper sides,



LYRE-TAIL.

and blunt. The wings are heavy, rounded, and concave, the first five quills increasing regularly in length from the first; and the four next them being equal in length, and the longest in the wing. The tail has very long feathers, and to the male those feathers have a peculiar form, which we shall notice afterward.

In some respects this is the most beautiful bird of New Holland; and in that country, as well as everywhere else, it stands alone, without there being any genus with which it has any considerable affinity. The colonists, according to the habit which most colonists have of calling new birds of the colony after old birds of the mother country, have given this bird the name of the wood pheasant, and sometimes of the lyre pheasant, on account of the peculiar form of the tail. These terms are misapplications, however, and ought to be discarded; and our knowledge of the bird must rest wholly on the description of itself, without any assistance from analogy.

When the weight, unwieldy, and roundness of its wings are considered, we need hardly mention that this is a bird which can neither feed upon the wing, nor make long flights, though its wings are, like those of the *Gallinidæ*, remarkably well adapted for rapid ascents and descents. Accordingly, it is like these in their native localities, a bird of the woods, and passes much of its time in trees or bushes, though it is also found upon the ground, and feeds principally there. Its feeding time is early in the morning, and the male struts about with something of the air of a dunghill cock, though we believe he is monogamous, and no battles of gallantry occur. It is found chiefly in places rather upland, where the ground is dry and covered with trees or brushwood; and its short round wings adapt it well for moving about in such places.

As we said, there is only a single species, *Menura lyrata*, which is about the size of a pheasant, though not so elegantly formed. It is, generally speaking, of a grayish brown color, with the throat, and the upper coverts and quills of the wings, reddish brown. None of the colors are bright, neither do they form any very striking contrasts; but, notwithstanding, their general appearance is very striking. It is the tail of the male bird, however, which forms at once the most striking external character, and the greatest beauty of the bird. The tail consists of sixteen feathers, twelve of which, six on each side, have the shafts exceedingly slender, and very few fibres instead of webs; but these fibres are long. The two feathers in the middle have their external webs closely set and straight; and the inner webs almost entirely wanting. The two external feathers are bent like the branches of a lyre; and when the tail of the animal stands erect, it bears a slight resemblance to that instrument, these feathers resembling the frame of a lyre, while the twelve slender ones resemble the strings. It is from this form of the tail that the bird has received its name, which is not inexpressive of the appearance of this appendage. Lyres, for that would be the best English name for them, and it is also the French one, are peaceable and harmless birds, remaining quiet in the shade of the thick branches and leaves during the day, so that they are but seldom seen at that time; and nothing is known with certainty of their nests, the numbers of their broods, or even their time of breeding. The male and female are usually found together, at at least not far apart, when they come out in the mornings and evenings to feed on the ground; and they are apparently very much attached to each other. They are not often seen, except by those settlers who reside very close on the bush in remote parts of the colony; for though their habit appears to be that of feeding upon the ground only, yet they do not frequent grounds on which there are no trees, the shade of these appearing to be indispensable to them in the heat of the day, as well as during the night. The structure of the bill is

decidedly insectivorous, or at all events adapted for collecting worms, mollusca, and other small ground animals; and the claws are adapted for scraping, though not so decidedly as those of poultry. In fact, the birds, and the country which they inhabit, are both so different from any thing else that we meet with, that they would require to be both carefully examined, in order that any just conclusion might be arrived at respecting the adaptation of each to the other, or the use of the birds in the general economy of nature.

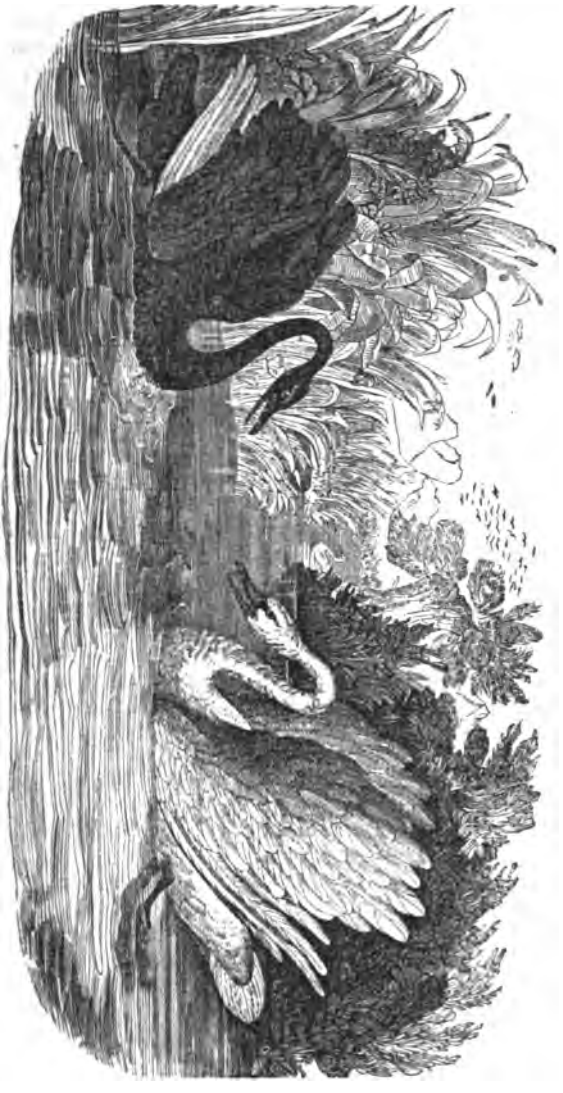
THE BLACK AND WHITE SWANS.

[See page 263.]

Of the characters by which the Swans are distinguished from the rest of the family to which they belong, the most remarkable are the extreme length of their necks; the oval shape of their nostrils, which are placed about the middle of their bill; the nakedness of their cheeks; the equal breadth of their bills throughout; the great depth of that organ at the base, where the vertical considerably exceeds the transverse diameter; and the position of their legs behind the centre of gravity. They are by far the largest species of the family; and there are very few birds that exceed them in magnitude. They live almost constantly on the water, preferring the larger streams and open lakes; and feed chiefly on aquatic plants, the roots of which they are enabled to reach by means of their long necks, for they rarely if ever plunge the whole of their bodies beneath the surface. They also devour frogs and insects, and occasionally, it is said, even fishes; but this last assertion is contradicted by almost every observer who has attended particularly to their habits, and seems quite at variance with the fact that the fish-ponds to which they are sometimes confined do not appear to suffer the smallest diminution in the number of their inhabitants from the presence of these inoffensive birds. We are moreover informed by Mr. Yarrell, that he has never found in the stomachs of any of the numerous individuals dissected by him the least vestige of such a diet. In their habits they are as peaceable as they are majestic in form, elegant in attitude, graceful in their motions, and, in the two species that are most commonly known to us, unsullied in the purity of their white and glossy plumage.

The distinguishing characteristics of the tame swan, are found chiefly in its bill, which is throughout of an orange red, with the exception of the edges of the mandibles, the slight hook at the extremity, the nostrils, and the naked spaces extending from the base toward the eyes, all of which are black. A large protuberance, also of a deep black, surmounts the base of the bill; the iris is brown; and the legs black, with a tinge of red. All the plumage, without exception, in the adult bird, is of the purest white. In length the full grown male measures upward of five feet, and more than eight in the expanse of its wings, which reach, when closed, along two thirds of the tail. Its weight is usually about twenty pounds, but it sometimes attains five and twenty or even thirty; and those which inhabit the southern coast of the Caspian are said to reach a still more enormous size. The female is rather smaller than the male; her bill is surmounted by a smaller protuberance; and her neck is somewhat more slender. When first hatched the young are of a dusky gray, with lead-colored bill and legs; in the second year their plumage becomes lighter, and their bill and legs assume a yellowish tinge; in the third year they put on the adult plumage and coloring of the naked parts.

The females choose for their nesting-place the least frequented situations on



THE BLACK AND WHITE SWAN.

the banks of the rivers or lakes which they inhabit, and build their nests in the rudest manner of twigs and reeds, lined with a comfortable coating of their breast feathers. They lay six or eight grayish eggs, and sit for five weeks, generally in April and May. As soon as the young birds are hatched, they are carried by both parents to the water, and for two or three weeks afterwards are borne upon their backs, or placed for shelter and warmth beneath their wings. The attentions of the parent birds are continued until the next pairing season, when the old males drive the young from their society, and compel them to shift for themselves. To prevent the tame ones from flying away, it is necessary every year to clip their quill-feathers; and this mutilation seems to deprive them not only of the power, but also of the desire, to regain their liberty. They accustom themselves with ease to the society of man, and seem even to become attached to him, probably in consequence of the kindness with which they are everywhere treated, and the peculiar privileges which they enjoy at his hands. Besides their natural food, consisting of plants, insects, snails, and similar productions, they eagerly devour bread and all kinds of grain, and in winter are chiefly kept on these substances, and the same kind of provender that is given to ducks and geese.

Although naturally one of the most gentle and inoffensive of birds, the large size and great muscular power of the swan render it a formidable enemy when driven to extremity, and compelled to act on the defensive. In such a case it is said to give battle to the eagle, and frequently even to repel his attack, forcing him to seek his safety in flight. It never attempts to molest any of the smaller water-fowl that inhabit its domains; but in the season of its amours it will not suffer a rival to approach its place of retreat without a sanguinary struggle, in which one or the other is generally destroyed. It is said to attain a very great age, thirty years being commonly spoken of as the term of its existence. It is even asserted that in Alkmar, a town in the north of Holland, there died, in the year 1672, a swan belonging to the municipality, which bore on its collar the date of 1573, and must consequently have been a century old; and several other instances of a similar nature have been related by authors. We must confess, however, that we entertain strong doubts of the authenticity of such statements, founded merely on popular tradition, and unsupported by any positive evidence.

So much for the white swan. We must now give a few remarks in regard to the black swan figured in our cut.

When the classical writers of antiquity spoke of the black swan as a proverbial rarity, so improbable as almost to be deemed impossible, little did they imagine that in these latter days a region would be discovered, nearly equal in extent to the Roman empire, even at the proudest period of its greatness, in which their "rara avis" would be found in as great abundance as the common wild swan upon the lakes of Europe. Such, however, has been one of the least singular among the many strange and unexpected results of the discovery of the great southern continent of New Holland. Scarcely a traveller who has visited its shores omits to mention this remarkable bird. An early notice of its transmission to Europe occurs in a letter from Witsen to Dr. Martin Lister, printed in the twentieth volume of the Philosophical Transactions; and Valentyn published in 1726 an account of two living specimens brought to Batavia. Cook, Vancouver, Philip, and White, mention it incidentally in their voyages; and Labillardière, in his narrative of the expedition of D'Entrecasteaux in search of La Pérouse, has given a more particular description, together with a tolerable figure.

Since this period many living individuals have been brought to England

where they thrive equally well with the emeus, the kangaroos, and other Australian animals, insomuch that they can now scarcely be regarded as rarities even in that country. They are precisely similar in form and somewhat inferior in size to the wild and tame swans, but are perfectly black in every part of their plumage, with the exception of the primary and a few of the secondary quill-feathers, which are white. Their bill is of a bright red above, and is surmounted at the base in the male by a slight protuberance, which is wanting in the female. Toward its anterior part it is crossed by a whitish band. The under part of the bill is of a grayish white; and the legs and feet are of a dull ash-color. In every other respect, except in the mode of convolution of its trachea, this bird corresponds perfectly with its well-known congeners.

The black swans are found as well in Van Diemen's Land as in New South Wales and on the western coast of New Holland. They are generally seen in flocks of eight or nine together, floating on a lake; and when disturbed, flying off like wild geese in a direct line one after the other. They are said to be extremely shy, so as to render it difficult to approach within gunshot of them.

GREEN BRAZILIAN MACAW, OR PAROQUET.

[See page 266.]

This is a small species, and may perhaps be regarded as forming a transition from the larger macaws, or macaws properly so called, to the macaw parrots. Its cheeks are naked, its forehead purple brown, and the rest of the body plumage green. The wings and tail-feathers are blue on the upper side, and dull red below. It is not larger in the body than a pigeon, being only about seventeen inches in length. It is a native of Brazil, where it occurs in numerous flocks, which do a great deal of mischief to the coffee plantations; though it is the pulp of the coffee berry which it eats, and not the seed or part which is used in commerce. It is much more familiar than the larger macaws, and visits the cultivated grounds much more frequently. It is also a bird of very inferior wing, and capable of taking only short flights. It is easily kept in a state of domestication, and very fond of being petted; but it is jealous and bad tempered, showing great hostility to strangers, and especially to children. If any one is made to share the attention bestowed on it, it is worked into a paroxysm of rage, attempts to fly at them, and bite and scratch, and never rests satisfied while those who are in the habit of caressing it pay attention to any other living creature. Its jealousy extends even to the other members of the parrot family, and it is seldom satisfied if any of the rest of them are in the room with it. Thus, though it is rather a handsome bird, it is unpleasant to keep in a collection among others; and as its powers of articulation are very limited, it is of no great value even to the curious, when kept singly. When, however, it enjoys the whole attention of those who fondle it, it can be amusing; and it expresses satisfaction in a peculiarly soft sort of murmur, and occasionally utters a sound having some resemblance to a laugh.

GREEN BRAZILIAN MACAW, OR PAROQUET.

THE OYSTER-CATCHER.

The Oyster-Catcher lives by the sea side, feeding on marine insects, for which it may be seen actively searching at low water. Their name of oyster-catcher is also derived from their expertness in extracting the oyster, which however can be done only when the shell is open, and not even then without great caution; for instances have been known of the unfortunate bird being made prisoner by the oyster closing upon its beak.

Its eggs are laid on the bare ground, for the nest, if it deserves to be so called, consists only of small shingle and shells thrown up by the sea, so little above highwater-mark, that in high spring tides they are frequently swept away. When taken young, they may be easily tamed, and they are in England frequently introduced into pleasure-grounds. We remember seeing very considerable numbers of them, some years ago, on the lawn of the pavilion at Brighton, collected by order of his late majesty George IV., where they were running about with the tameness and familiarity of poultry. Nothing could be more ornamental than their smart pielabl glossy coats, in contrast with their long, bright, orange beaks and legs, and crimson irides.

HUMMING-BIRDS.

(See pages 198, 276.)

The Humming-Birds are a most singular genus or group, resembling slightly the nectar-suckers of the Eastern continent, but still vastly different from them in almost every respect; and different indeed from all known birds. They are the smallest of the feathered tribe, some being not much more than half an inch in length; they are the most beautiful in the texture and colors of their plumage; for no matter and no other substance can come up to the richness of their tints,

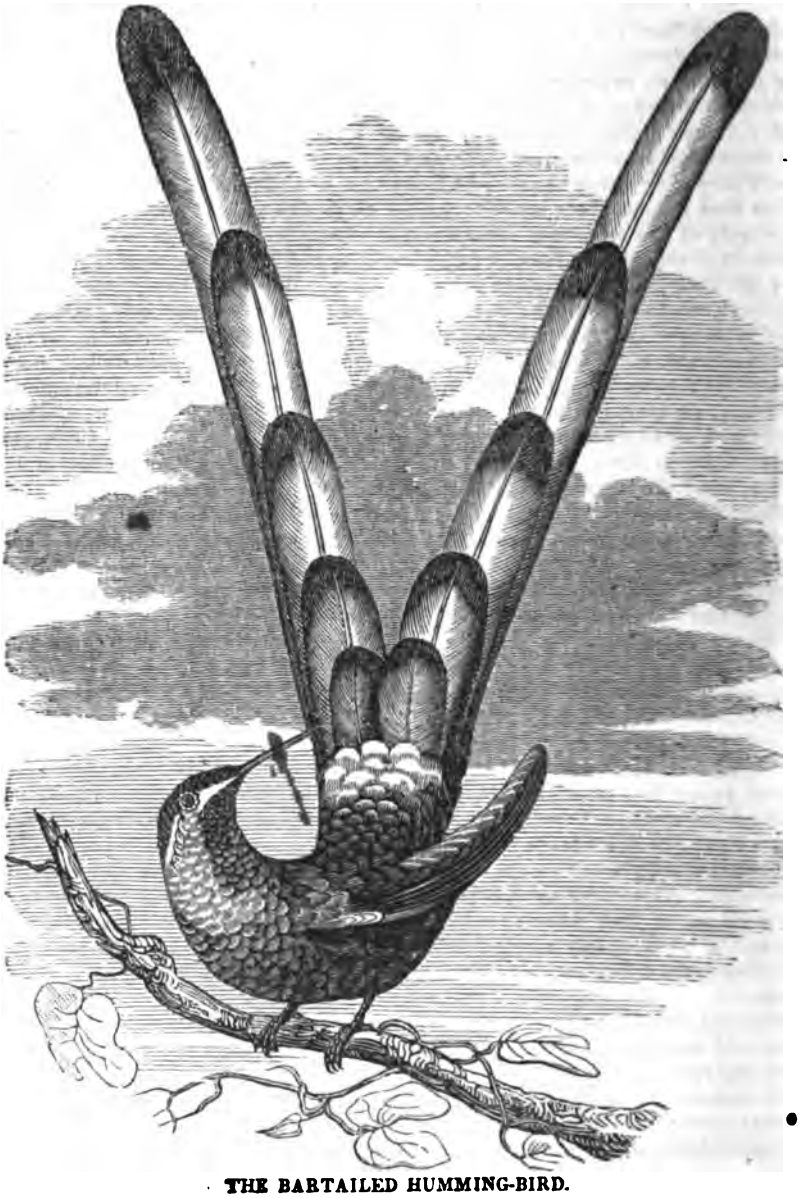
THE HUMMING-BIRD.

or the glowing brilliancy of their metallic reflections. They are the most active of all known birds, exceeding in this respect even the swifts; they are still more powerfully winged, in proportion to their size, than these are; and there are no birds which have the sternum and the bones which give firmness to the shoulder more finely developed. In fact, the whole of their energy is concentrated upon this part of their organization, and their different styles of flight are all equally vigorous. Suspended in the air, and hovering over a flower, their wings move with so much rapidity that they are not seen except as gleams of light of different colors, but all radiant, as the beams of the sun take them at those angles at which they give out their different lustres; and while the rapid motion of the wings thus renders them invisible, except as gleams of light playing around the little body of the bird, they make a sound similar to that of the humming produced by the wings of bees and other insects; and it is on account of this, that they get their English name of humming-birds. They can hover about in this way for a considerable time; and this rapid motion of the wings, when hovering, appears to give them an impetus for flight, in like manner as a similar, though slower motion, gives an impetus to eagles and other birds of prey, which stoop with great rapidity through the air. In consequence of the impetus thus given, the humming-birds can in an instant dart from one place to another, upward, downward, or laterally, without any apparent effort. When they take longer flights, they do not fly on a level with steady wing, but describe a series of flat arches, each arch appearing as if it were a separate leap in the air.

They are exclusively birds of the American continent, and in the rich and warm districts within the tropics, they swarm as numerously as flies do in summer in the forests of Lapland or Canada. The known species amount to several hundreds; and as their native localities are not easily explored, the unknown species may be very numerous. Individually, they absolutely swarm and people the whole atmosphere with the most brilliant, though minute glories of the living world, which are at the same time in a state of wonderful activity; they are not confined to America, within the tropics, nor to the low and warm parts of the tropical countries; though everywhere they are more numerous, and in greater variety, in proportion as the place is more warm and fertile. Some, however, are found high upon the table-lands, and slopes of the mountains, where the climate is not only temperate, but absolutely cold; others range as far southward as the strait of Magellan, and probably, also, into Terra-del-Fuego, while others again are found to the north of Canada as high as the fifty-seventh parallel of north latitude; while on the west side of North America they reach to latitudes still higher. Nor must it be supposed, that even in this cold latitude they are at all out of their place or their element; for when Captain King was surveying the coast of the extreme south of America, he found large flocks of humming-birds flying about, apparently at their ease, in the middle of a snow-storm.

The texture of their plumage is indeed as worthy of attention as the tints of color, and the brilliant metallic reflections; for though they are very little birds in all the species, and not larger than humble-bees in the most minute one, their plumage is exceedingly compact, and probably forms a better defence against alternations of heat and cold, and of drought and moisture, than that of any other birds whatever. The individual feathers are beautifully formed; and more compactly laid than those of any others, if we except the under parts especially, of those birds which are almost constantly in the water without ever getting wet.

One of the most curious of the humming-birds, is the one seen on the following page; it is called the bar-tailed humming-bird. It is a most singular



THE BARTAILED HUMMING-BIRD.

species, and considerably larger than many of the others. It is understood to inhabit a considerable extent of the table-land of the Andes, both in Mexico and Peru; but it has not hitherto been found in any of the coast countries or the islands. The bill is a little bent, awl-shaped, and very sharp at the point. The upper parts are golden-green, with a slight tinge of purplish-brown; the under part from the bill to the middle of the belly is bright emerald-green, peculiarly rich on the middle of the throat, and composed of scaly feathers which extend along the whole of the breast. The lower part of the belly is all green, and the vent feathers grayish-white. The rump is clear and red, but without any metallic lustre, and the feathers have not a scaly appearance. The tail, however, is the most singular part of this bird. It consists of two parts, standing at an angle to each other like the letter V. The outside feather in each branch is very long, not less than six inches. The second feather is only about three inches and a half, the third a little more than two inches, the fourth shorter than that, and the last one about three quarters of an inch. The principal color of these feathers is bright reddish orange, of a very brilliant metallic lustre, and varying in different lights through different shades from red to yellow. There is a black bar across the end of each feather, which shortens as the feathers shorten. This bar is carried down the outer margin of every feather except the first and second, and the basal two thirds of the first have also the outer margin black. Where the margin is black, the shaft of the feather is also black; and where there is no black margin, the shaft is relieved by a slender black line upon each side. Altogether, it is one of the most singular appendages to be met with in the whole feathered creation; and though we are not very well informed with regard to the manners of many of the family, the strong fortification of coverts which this tail possesses would lead us to conclude that it is capable of some corresponding action which is essential to the economy of the bird.

EIDER DUCKS—MALE AND FEMALE.

[See page 272.]

The Eider Duck is an inhabitant of the northern regions, seldom seen in low latitudes; it breeds in the north of Scotland, and is common on the Western Isles, and also on the Farn Islands, on the coast of Northumberland. It makes its appearance mostly in the months of June and July, those being probably the months of incubation, or hatching its young. It seldom lays more than five or six eggs, of a pale greenish olive color. The nest is on the ground, composed of plants from the seaside, and lined with down, most of which is plucked by the female from her own body; and so fine and light is this down, that a moderate hat-full, not pressed close, will not weigh more than three quarters of an ounce. This down forms a considerable article of merchandise, from the northern parts, where flocks of the eider duck frequent, to the southern countries, where it is used for pillows, stuffing of quilts, and such purposes as render both ease and elegance to the qualities of convenience for repose and indulgence. Perhaps we are not acquainted with all its uses, and consequently do not fully understand its value; the uses, however, that we do know to which it is applied, remind us of a bountiful Providence, that gives us the command of all that fly in the air, glide in the waters, or float on its surface, and of all that tread the earth, whose fleeces adorn and comfort us, whose exuberances fall to our share, whose plumage affords us the soft cure of fatigue, the gentle solace of rest;

EIDER DUCKS—MALE AND FEMALE.

and whose very bodies resuscitate and renew our strength. The young taken from the nest of the eider duck have never, we believe, been domesticated; but if the impregnated eggs were placed under a common tame duck, and the duckings, when hatched, fed with such aliment as the eider ducks mostly seek, till they partook of other food, it is not unlikely the next brood of those ducks, so reared, would be tame, like those that swim in our ponds; but then they would lose their other properties, and cease to be eider ducks.

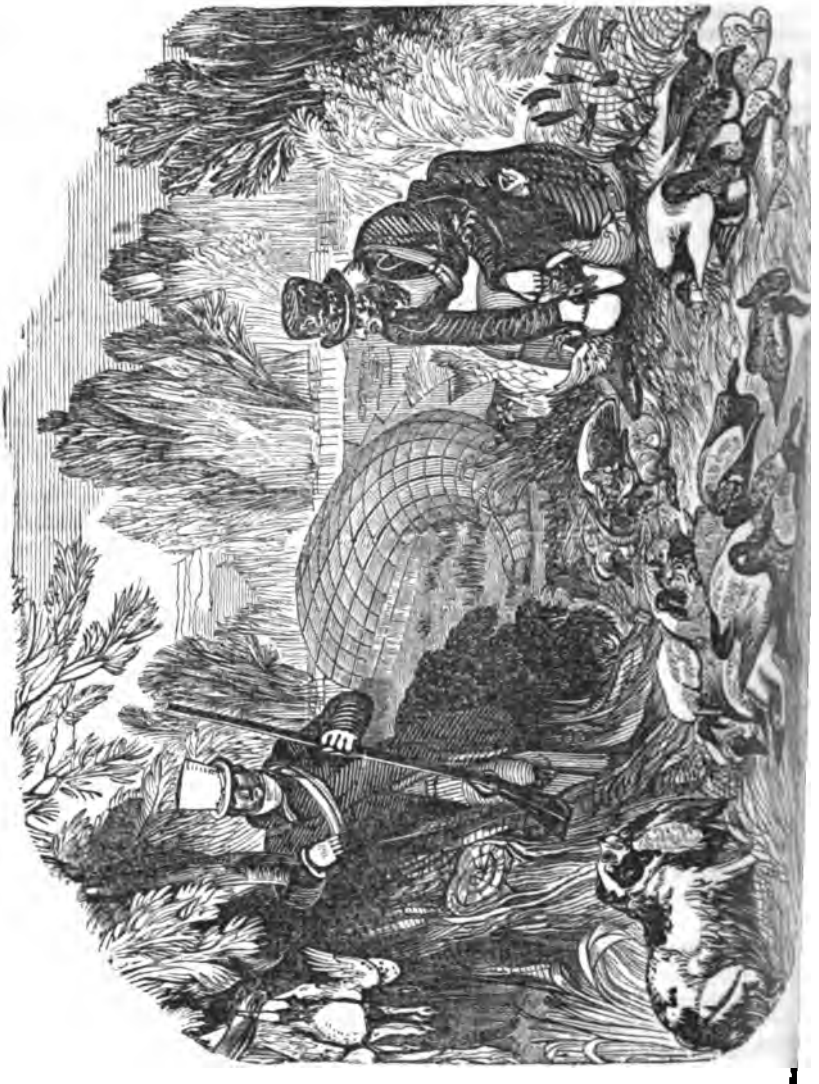
Dr. Latham remarks, that this duck is found in the highest latitudes yet visited, even in the polar regions; and he thinks it feeds principally on shellfish. These are the chief particulars of the eider duck.

METHOD OF CAPTURING WILD DUCKS.

(See page 274.)

THE decoys used in England, particularly in the fens of Lincolnshire, are superior to any method of catching Wild Ducks with which we are acquainted. A circumstantial account of this process is given by Bewick, and illustrated by our woodcut.

In the lakes to which the wild ducks resort, their most favorite haunts are observed. Then, in the most sequestered part of this haunt, a ditch is cut, which is about four yards across at the entrance, and decreases gradually in width from the entrance to the further end, which is not more than two feet wide. The ditch is of a circular form, but does not bend much for the first ten yards. The banks of the lake on each side of this ditch (or "pipe," as it is called) are kept clear from reeds, coarse herbage, &c., in order that the fowl may get on them to sit and dress themselves. Along the ditch poles are driven into the ground close to its edge, on each side, and the tops are bent over across the ditch and tied together. These poles, thus bent, form at the entrance of the ditch or pipe an arch, the top of which is ten feet distant from the surface of the water. This arch is made to decrease in height as the pipe decreases in width, so that the remote end is not more than eighteen inches in height. The poles are placed about six feet from each other, and connected by poles laid lengthwise across the arch and tied together. Over the whole is thrown a net, which is made fast to a reed-fence at the entrance, and nine or ten yards up the ditch, and afterwards strongly pegged to the ground. At the end of the pipe farthest from the entrance is fixed a "tunnel-net," as it is called, about four yards in length, of a round form, and kept open by a number of hoops, about eighteen inches in diameter, placed at a small distance from each other to keep it distended. Supposing the circular bend of the pipe to be to the right when one stands with his back to the lake, then on the left hand side a number of reed-fences are constructed, called "shootings," for the purpose of screening the "decoy-man" from observation, and in such a manner that the fowl in the decoy may not be alarmed while he is driving those that are in the pipe. These shootings, which are ten in number, are about four yards in length, and about six feet high. From the end of the last shooting a person cannot see the lake, owing to the bend of the pipes, and there is then no further occasion for shelter. Were it not for these shootings, the fowl that remain about the mouth of the pipe would be alarmed if the person driving the fowl already under the net should be exposed, and would become so shy as entirely to forsake the place. The first thing the decoy-man does when he approaches the pipe is to take a piece of lighted turf, or peat, and hold it near his mouth, to prevent the birds



[illegible] smelling him. He is attended by a dog, trained for the purpose of render-[illegible] him assistance. He walks very silently about half-way up the shootings, [illegible] a small piece of wood is thrust through the reed-fence, which makes an [illegible] just large enough to enable him to see if any fowl are in; if not, he [illegible] forward to see if any are about the entrance of the pipe. If there are, [illegible] and makes a motion to his dog, and gives him a piece of cheese, or [illegible] else, to eat; and, having received this, the animal goes directly to a [illegible] through the reed-fence, and the birds immediately fly off the bank into the [illegible]. The dog returns along the bank between the reed-fences, and comes [illegible] his master at another hole. The man then gives him something to re-[illegible] and encourage him, and the animal repeats his round until the birds are [illegible] by his motions, and follow him into the mouth of the pipe. This [illegible] is called "working" them. The man now retreats farther back, [illegible] the dog at different holes until the ducks are sufficiently under the net. [illegible] commands his dog to lie down behind the fence, and going himself [illegible] to the end of the pipe next the lake, he takes off his hat and gives it a [illegible] between the shooting. All the birds that are under the net can then see [illegible] but none that are in the lake can. The former fly forward, and the man [illegible] to the next shooting and waves his hat, and so on, driving them along [illegible] they come to the tunnel-net, into which they creep. When they are all [illegible] man gives the net a twist, so as to prevent them from getting back. [illegible] takes the net off from the end of the pipe, and taking out, one by one, [illegible] that are in it, dislocates their necks. The net is afterwards hung on [illegible] the repetition of the process; and in this manner five or six dozens [illegible] sometimes been taken at one drift. When the wind blows directly in or [illegible] of the pipes the fowl seldom work well, especially when it blows into the [illegible]. The reason of this is, that the ducks always prefer swimming against [illegible] wind, otherwise the wind blowing from behind catches and ruffles their [illegible]. If many pipes are made in the same lake, they are so constructed as [illegible] different winds, and are worked accordingly. The better to entice the [illegible] into the pipe, hemp-seed is occasionally strewn on the water.

[illegible] ducks are also used for the purpose of leading the way into the pipe. [illegible] the term "decoy-ducks." These birds are fed on the pond, and made [illegible] tame, and come to the keeper's whistle, to eat the hemp-seed which he [illegible] on the pond. They generally lead the way into the pipe when whistled [illegible]. As they are used to the sight of the keeper, they do not rush forward with [illegible] wild ones into the net, but return back again safe into the pond; or if any [illegible] should be driven forward, they are easily, by their color, distinguished [illegible] the wild ones.

TAKING OF BIRDS' EGGS.

It is chiefly on the most rugged shores of Scotland, or on the more rugged [illegible] of the several adjacent islands, or still further to the north, in the Shetland [illegible] Verroe islands, that the "dreadful trade" of egging is carried on in the per-[illegible] of its horrors; though in some parts of Wales, as, for instance, near the [illegible] Stack, and the Needle rocks in the isle of Wight, adventurous climbers [illegible] occasionally exhibit feats of perilous achievement, quite sufficient to satisfy [illegible] beholders. In some parts of the coast, immense mounds or fragments of [illegible] have been cut off from the mainland by terrible convulsions of nature, or [illegible] incessant wearing of waves through fissures and narrow channels for suc-

cessive ages. On a few of these spots, sea-birds, for a time, rested securely, till some bold adventurers devised the means of invading their territories, crossing the space by means of cradles, suspended on ropes thrown across.

At Carrick-a-Reade, near the Giants' Causeway in Ireland, and in the Shetland islands, two of these airy conveyances are still in use, and, until a suspension-bridge was erected a few years ago, a third, and tolerably commodious and safe one, existed, connecting the South Stack rock with Holyhead mountain, in lieu of an original and far more primitive machine, which was, for a time, of necessity resorted to by those who wished to inspect the works on the island. It consisted of a small box, suspended on two strong ropes swung across a chasm of about a hundred and fifty feet, commencing its journey from a projecting point, about halfway down the precipice of the mainland, from which the passenger was vaulted over the gulf, by a rope leading to the island: a journey which, together with the scrambling down the unprotected face of the precipice, was sufficiently disagreeable and alarming, to convey a correct idea of the far more terrific communications adopted in less frequented places; such as that in Shetland, between the headland of Bressa, a sort of column rising out of the sea to the height of three or four hundred feet above its level, and not more than four yards in diameter on its summit. It is said that this cradle, by which the inhabitants pass easily and readily, and from habit, without any fear of danger, was erected by a bold man in the neighborhood, who mounted the hitherto supposed inaccessible sides of the rock. A great number of people were assembled, expecting to see him lose his footing, and fall headlong: however, he succeeded, and when at the top, waved his hat and cheered his friends; and then having, with their assistance on the opposite side, arranged the ropes and cradle might have been the first to cross safely and successfully over his

Egging.

own bridge—but being foolhardy, and determined to descend by the way he had got up, before he had accomplished a third of the distance, his foot slipped, and he was dashed to pieces.

But though here and there accommodations like this, or others, for facilitating the visits of the bird-catchers to their particular haunts, may be at hand, by far the greater number are taken by enterprising individuals, who have only their own steadiness of head, strength of muscle, and dauntless spirit, to ensure success. We will describe the means and proceedings of those in St. Kilda, a small speck of an island, the most westward and distant (save a still smaller needle-pointed uninhabited coast, called Rockall) in the midst of the Atlantic ocean, containing a few people, who from infancy accustomed to precipices, drop from crag to crag, as fearlessly as the birds themselves. Their great dependence is upon ropes of two sorts; one made of hides—the other of hair of cows' tails, all of the same thickness. The former are the most ancient, and still account in the greatest esteem, as being stronger, and less liable to wear away, or be cut by rubbing against the sharp edges of rocks. These ropes are of various lengths, from ninety to a hundred and twenty, and nearly two hundred feet in length, and about three inches in circumference. Those of hide are made of cows' and sheep's hides mixed together. The hide of the sheep, after being cut into narrow slips, is plated over with a broader slip of cow's hide. Two of these are then twisted together; so that the rope, when untwisted, is found to consist of two parts, and each of these contains a length of sheepskin, covered with cow's hide. For the best, they will ask about thirteen pence a fathom, at which price they sell them to each other.

So valuable are these ropes, that one of them forms the marriage-portion of a St. Kilda girl; and, to this secluded people, to whom moneyed wealth is little known, an article on which often life itself, and all its comforts, more or less, depend, is far beyond gold and jewels.

The favorite resort for sea-fowl, particularly the oily Fulmars, is a tremendous precipice, about thirteen hundred feet high, formed by the abrupt termination of Conachan, the most elevated hill in the island, and supposed to be the highest precipitous face of rock in Britain, and so tremendous, that one who was accustomed to regard such sights with indifference, dared not venture to the edge of it alone; but held by two of the islanders, he looked over into what might be termed a world of rolling mists and contending clouds. As these occasionally broke and dispersed, the ocean was disclosed below, but at so great a depth, that even the roaring of its surf, dashing with fury against the rocks, and rushing with a noise like thunder, into the caverns it had formed, was unheard at this stupendous height. The brink was wet and slippery—the rocks perpendicular from their summit to their base; and yet, upon this treacherous surface, the St. Kilda people approached, and sat upon the extremest verge; the youngest of them even creeping down a little way from the top, after eggs or birds, building in the higher range, which they take in great numbers, by means of a slender pole like a fishing-rod, at the end of which was fixed a noose of cow-hair, stiffened at one end with the feather of a Solan goose.

But these pranks of the young are nothing when compared to the fearful feats of the older and more experienced practitioner. Several ropes of hide and hair are first tied together to increase the depth of his descent. One extremity of these ropes, so connected, is of hide, and the end is fastened like a girdle round his waist. The other extremity is then let down the precipice, to a considerable depth, by the adventurer himself, standing at the edge: when, giving the middle of the rope to a single man, he descends, always holding by one part of the rope, as he lets himself down by the other, and supported from falling only

Bird-catching in Scotland.

by the man above, who has no part of the rope fastened to him, but holds it merely in his hands, and sometimes supports his comrade by one hand alone, looking at the same time over the precipice without any stay for his feet, and conversing with the other, as he descends to a depth of nearly four hundred feet. A bird-catcher, on finding himself among the Fulmar's nests, took four, and with two in each hand, contrived, nevertheless, to hold the rope as he ascended; and striking his foot against the rock, threw himself out from the face of the precipice, and returning with a bound, would again fly out, capering and shouting, and playing all sorts of tricks. Frightful as such a display must be to those unaccustomed to it, accidents are extremely rare; and the St. Kildians seem to think the possibility of a fatal termination to these exploits almost out of the question.

FISH.

WHALE FISHING.

[See page 279.]

Among the various pursuits of commercial nations, there is none so arduous and dangerous as the fisheries, and especially the Whale Fishery. Success in it, too, is quite uncertain, when applied to individual vessels, for three years are sometimes spent, and the earth nearly or quite circumnavigated by a crew, and they return home with a simple pittance. Yet where large companies are formed, and many vessels are employed at the same time, it is a business which is sure to give an ample equivalent for all the capital, time, and labor invested.

This trade was for a long time a source of large revenue to the Dutch and English governments, whose fishing region was confined chiefly to the northern seas, in the vicinity of Greenland and Spitzbergen. But the great number of vessels that went annually upon those fishing grounds disturbed the whales, and they deserted their old haunts for places more secure. The whales found in these regions are called black or right whales, and furnish oil of an inferior quality to that procured from the sperm whale of the Pacific ocean and the South Seas.

For many years a great number of American vessels and seamen have been employed in this trade, the largest proportion of which are sent out from Nantucket and New Bedford. They are chiefly engaged in the sperm fishery; and it is estimated that in the Pacific there are now upward of eight thousand American seamen employed in this business.

The manner of taking whales is as follows:—as soon as one is discovered by his blowing or spouting, the boats are got out, and each manned with six or seven men. These boats are so constructed that they dart over the water with great speed, and are managed with ease and facility. They row till they come near the whale, when the harpooner, standing in the bow, strikes it with a harpoon near the snout, or the fore fin. In an instant the whale darts off, sometimes near the surface, at others diving many fathoms toward the bottom. Care is then taken to give it plenty of line, and as it sometimes runs out more than the whole length of the line, (upward of two hundred fathoms,) a man stands ready to cut it, otherwise the boat would be drawn under. So rapidly does the whale proceed, that it is necessary to wet that part of the boat over which the line passes, to prevent the friction from setting it on fire.

Whales are so much amphibious in their nature, that they cannot remain a very long time below water, but come up to breathe. This being the case, they frequently receive a second and even a third harpoon, before the fatal blow is given. These second attacks are the most dangerous to the whalers, and frequently boats are destroyed by the *flukes* of the fish, when it is rendered furious by pain.

The fat whales do not sink as soon as dead, but the lean ones do, and come up some days afterward, when they are towed to the side of the ship, and the blubber or part containing the oil is detached from the carcass and taken on board. The bone is then secured and the carcass sent adrift.

The imminent danger to which whalers are exposed, is represented in our engraving, and well described in the following sketch from the pen of Captain Marryatt. It is a part of a long yarn, spun by an old tar:—

"Well, we had waited about half an hour, when we saw a whiff at the masthead of the ship; we knew that it was to direct our attention to some other point, so we looked round the horizon, and perceived that there was a 'school' of young bulls, about three miles from us. We were four boats in all; and the first mate desired my boat and another to go in chase of them, while he remained with the other two, for this old whale to come up again. Well, off we went, and soon came up with the school; they are the most awkward part of whale fishing; for they are savage, and, moreover, easily 'gallied,' that is, frightened. I picked out one, and tried to come up with him; but he was very shy, and at last he raised his head clean out of the water, and set off at the rate of ten miles an hour; this showed that he was aware of danger. I had just thought of giving him up and trying for another, when he suddenly turned round, and came right toward the boats. That, we knew, meant mischief; but, in coming toward us, he passed close to the other boat, and the steersman gave him the harpoon right well into him. This made him more savage, and he stood right for my boat, ploughing up the sea as he rushed on. I was all ready in the bow with the harpoon, and the men were all ready with their oars to pull back, so as to keep clear of him. On he came, and when his snout was within six feet of us, we pulled sharp across him, and as we went from him, I gave him the harpoon deep into the fin. 'Starn all!' was the cry, as usual, that we might be clear of him. He 'sounded' immediately, that is, down he went, head foremost, which was what we were afraid of, for you see we had only two hundred fathoms of line in each boat; and having both harpoons in him, we could not bend one to the other, in case he 'sounded' deep, for sometimes they will go down right perpendicular, and take four lines, or eight hundred fathoms with them; so we expected that we should this time lose the whale as well as our lines, for when they were run out, we must either cut or go down with him. Well, the lines ran out so swift, that we poured water on them that they might

not fire—and we thought that it was all over, for the lines were two-thirds out, and he was going down as fast as ever, when all of a sudden he stopped. We were hauling in the slack lines, when we saw him rise again, about a quarter of a mile off. It was a hurrah, for we now thought that we had him. Off he set with his nose up, right in the wind's eye, towing the two boats at the rate of twelve miles an hour; our stems cleaving through the sea, and throwing off the water like a plume of feathers on each side of the bows, while the sun's rays pierced through the spray and formed bright rainbows. We hoped soon to tire him, and to be able to haul in upon our lines, so as to get near enough to give our lances; but that was only hope, as you'll hear. Of a sudden, he stopped, turned round, and made right for us, with his jaws open; then, all we had to do was to balk him, and give him the lance. He did not seem to have made up his mind which boat he would attack—we were pretty near together, and he yawed at one, and then at the other. At last he made right for the other boat, and the boatsetter dodged him very cleverly, while we pulled up to him, and I put the lance up to the stock into his side. He made a plunge as if he were going to 'sound' again; and as he did so, with his flukes he threw our boat into the air, a matter of twenty feet, cutting it clean in half, and one of the boat's thwarts came right athwart of my nose, and it never has been straight since. So now you have it, messmate; and I shouldn't mind if you passed the beer this way, for this long yarn has made my throat somewhat dry."

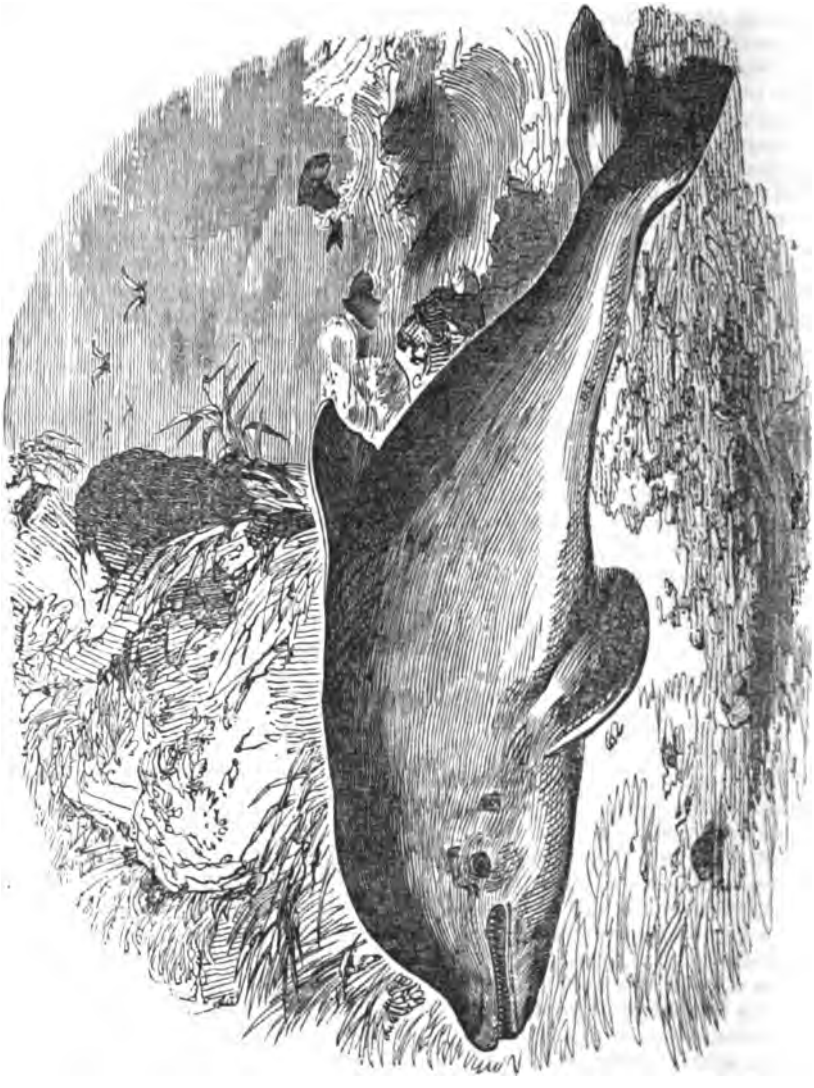
"When you've had your swig, old chap, you may as well tell us how the matter ended," observed my father.

"Why it ended in our losing the whale in the first place, and the boat with her gear in the second. We were picked up by the other boat, and there was no time to be lost, for the sharks were brought together by the scent of the whale's blood; the whale sounded again, and we were obliged to cut the line, and return on board."

THE PORPOISE.

[See page 282.]

The *cetacea* (an order of *mammalia* comprising the whale, the grampus, the porpoise, &c.) were formerly classed with *fishes*, and in common language still bear that ill-applied title. Hence we read of the "*whale-fishery*," and of the number of "*fish*" taken upon any occasion. The cetacea are not "*fish*" in any sense of the word. They breathe the atmospheric air by means of lungs; their heart consists of two auricles and two ventricles; their blood is warm; they bring forth living young, and manifest toward them great attachment, nursing and protecting them with remarkable assiduity. As it respects the general form of their body and the construction of their limbs, the *cetacea* differ considerably from all terrestrial mammalia; and the reason is evident—their exclusive destination to aquatic habits. Terrestrial mammalia are covered with hair, wool, spines, scales, or plates of mail; in the *cetacea*, we find the skin naked and smooth—a circumstance in strict harmony with their structure and habits. In its general outline, the body has considerable resemblance to that of a fish, being of an oblong form, and terminating in a thick, muscular tail, furnished, at the extremity, with a horizontal cartilaginous paddle. There are no posterior limbs, and the anterior are modified into the form of short broad oars, which they resemble also in their use. But the great muscular force resides in the tail; its action is not, however, from side to side, as we see in the fish, but up



THE PORPOISE.

and down, and the reason of this arrangement is very evident;—the cetacea breathe air, and are obliged to inspire every few minutes, hence, plunging as they do into great depths, they are enabled to raise themselves, by a succession of vigorous strokes, with great rapidity to the surface. What is termed "blowing" by the whale-fishers is nothing more than the forcible expiration of the breath before the animal has reached the surface. Having retained his breath as long as possible, as he ascends, he begins to force out, through his nostrils, the pent-up air, which throws aloft the water in a jet or column. The position of the nostrils in the cetacea is well worthy consideration. Of little use as olfactory organs, they are the exclusive apertures through which the process of breathing takes place. In other mammalia, the nostrils are placed at the extremity of the muzzle, but in the cetacea the muzzle or snout is always immersed beneath the surface, and cannot well be elevated. Where, then, can these organs be conveniently situated?—On that part which, as the animal floats, rises naturally above the surface. They open on the top of the head, and lead, in the whales, into a large sack, where the air, before being expired, is pent up, and whence it is violently expelled by the compression of powerful muscles. The larynx or windpipe is prolonged into the posterior *nares*, or back of the nostrils, in the form of a cone, so that the air is immediately conducted to the lungs through an uninterrupted channel. As it regards the organs of sight and hearing, we may observe that, as in fish, the eye is adapted to the density of the surrounding medium, the cornea being flat, and the crystalline lens globular. The external aperture of the ear is very small and capable of being closed.

The cetacea appear to have no neck. They have no distinct interval of separation between the head and the trunk, yet, if we examine their skeleton, we shall find that they possess the number of cervical vertebræ common to all mammalia, namely, seven. The neck of the giraffe also consists of seven vertebræ. But, in the one case, we find the vertebræ elongated to the utmost, in the other case, the whole seven are compacted closely together, and so compressed as to lose the usual appearance of such bones;—they scarcely occupy the space, in length, of a single vertebræ of the giraffe. Hence the neck of the cetacea is immoveable and solid.

The cetacea are divided into several groups. Some are herbivorous, as the dugong, feeding on the submarine vegetables which grow in shallows or near shore; most, however, are carnivorous, preying on the fish and other tenants of the ocean. To this latter family must be referred that common native of our Atlantic shores, the porpoise, (*Phocæna communis*, Cuvier.)

The porpoise is the smallest of the cetacea, seldom exceeding five feet in length. It frequents, in troops, the bays and inlets of our coast, and especially the mouths of rivers, not unfrequently advancing to a considerable distance up their stream. In such places it is often taken in nets by the fishermen, becoming entrapped while eagerly pursuing its prey. When the shoals of herring and other fish which periodically visit our coast make their appearance, they are harassed, among other enemies, by this active and voracious animal, which revels in the luxury of a perpetual feast; and, as its appetite is enormous and its digestion rapid, the slaughter in which it appears incessantly occupied must be very great. The porpoise is common in the vicinity of New York, and few have sailed among the islands in its bay, or up Long Island sound, who have not seen these animals, tumbling along, as they appear to do, in the rushing waves. The peculiarity of their motion results from the horizontal position of the tail-paddle, and the up-and-down stroke which it gives; and their momentary appearance is for the purpose of breathing, which accomplished, they plunge down in search of their food. In former days, the flesh of the porpoise was

highly esteemed as a delicacy for the table, and was served at public feasts in England; indeed, it is but lately that it has fallen into disrepute, and been omitted at city entertainments, where the turtle usurps its place. Our forefathers must have had a different notion about table delicacies from ourselves; for few, we believe, would now relish the rank, oily, fishy flesh of this animal.

STAR FISHES.

[See page 285.]

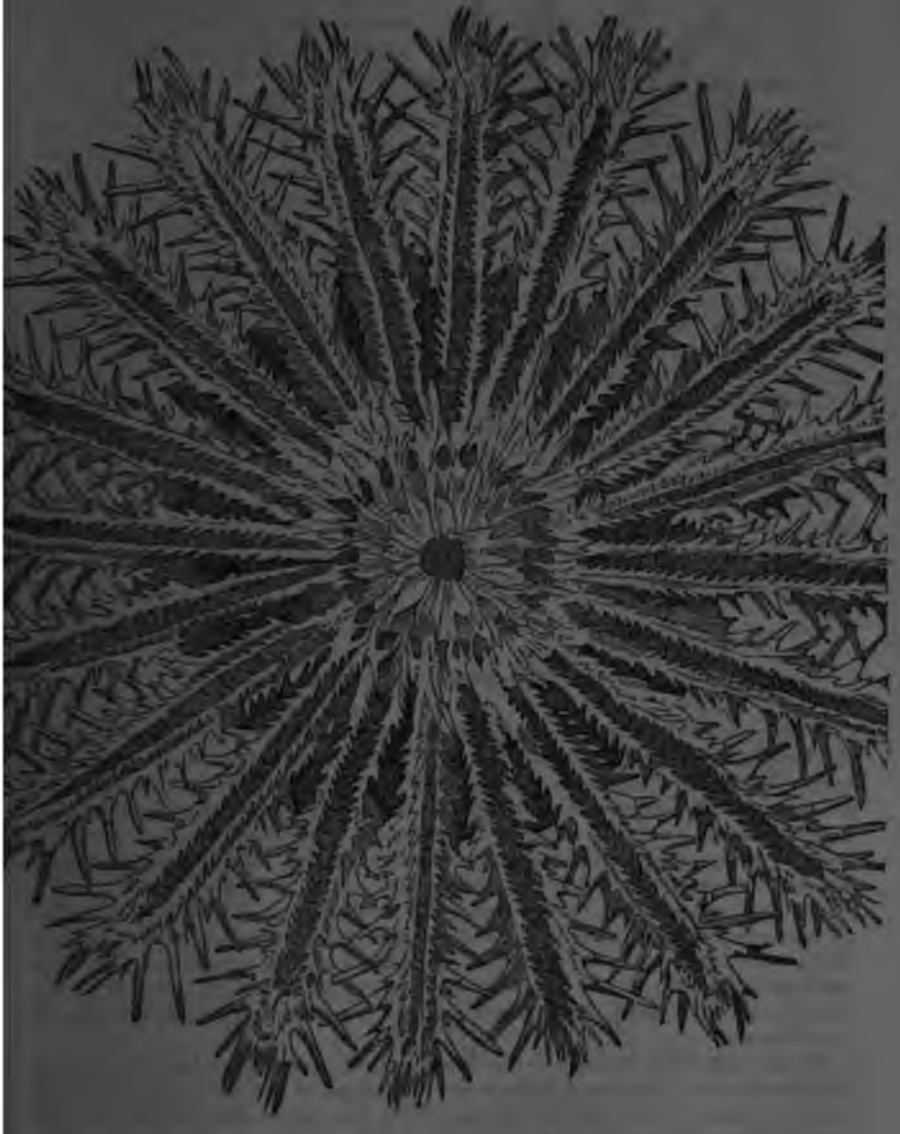
The "dark unfathomed caves of ocean" are full of zoological wonders; but little more is known of their history than that which the occasional sight of a piece of coral, a sea-egg, an animal flower, a wheel animal, or a common "five-finger" conveys.

One of the most interesting of these marine families is that which comprises the Star Fishes, the Radiata of naturalists. Before, however, we proceed to describe them, it will be necessary to say a few words in explanation of the order of animals to which they belong, the zoophytes, or *zoophyta*, of systematic writers.

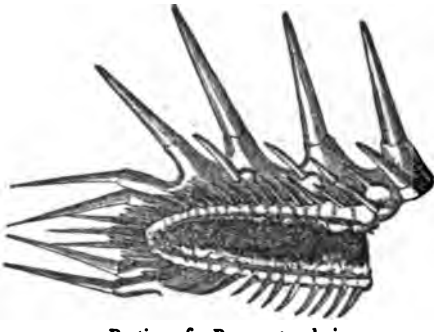
The zoophytes are distinguished by their radiated structure—their parts being disposed about a common axis in two or more rays. They are destitute of a real circulating apparatus, and their nervous system is so obscure as to be scarcely visible. Respiratory vessels pervade and aerate more or less their whole structure. Only in two genera are found organs analogous to feet, though a great majority of the species have *tentaculæ*, or, as they are vulgarly called, "feelers," for seizing the food on which they live, to assist in attaching them to fixed objects, and for enabling them to move from place to place. The organs of digestion consist of an intestinal canal, simple in some species, and compounded in others. The mouth is sometimes furnished with hard substances, resembling teeth. In some tribes these characters are so simplified or abridged, that the whole animal is nothing but a hollow bag, with tubular arms, for the absorption or seizure of aliment. In the proper zoophytes there is no distinction of sex, though in some tribes the young are produced from eggs, while in others they grow like buds on the body of the parent animal, and separate spontaneously when sufficiently developed, and capable of providing for their own wants.

All the zoophytes are, as we have already hinted, inhabitants of the waters. Most of them are found in the seas and oceans; but many reside in fresh water, in various artificial liquors, or in certain fluids of other animals. They are remarkable for great tenacity of life and general lowness of irritability; so that it is difficult to destroy them, and many species may be multiplied by cutting them to pieces.

The star fishes (*Asterias*, *Lam.*) constitute the princes of this interesting order; they exhibit all the peculiarities common to the genera, and every one of them in perfection. Lamarck divides them, according to their forms, into two sections, the *scutellated* and the *radiated* star fishes; the former have a pentangular shield-shaped body, the rays of which appear only in an incipient form, giving, as it were, the first indications of the family to which they belong; the latter have a smaller body, furnished with rays, which are lengthened out beyond a diameter of the body.



STAR FISHES.



Portion of a Ray, natural size.

The mouth is placed on the under-surface: from this, as a centre, the rays diverge. Each ray is divided at bottom by a longitudinal channel, which is pierced on its sides with small holes: these holes are the sockets of a number of little membraneous suckers, or feet. By fastening these little appendages to the rock or bottom on which the fish rests, they become comparatively immoveable, and by alternately advancing them in the manner of the legs of millipedes, fastening them at each step, the body is drawn in whatever direction the animal may please. The little moveable spines with which the body is covered may also assist its motions. The whole surface is pierced by pores, through which pass tubes much smaller than the feet, serving, probably, to absorb the water, and introduce it into the general cavity, for the purposes of a kind of respiration.

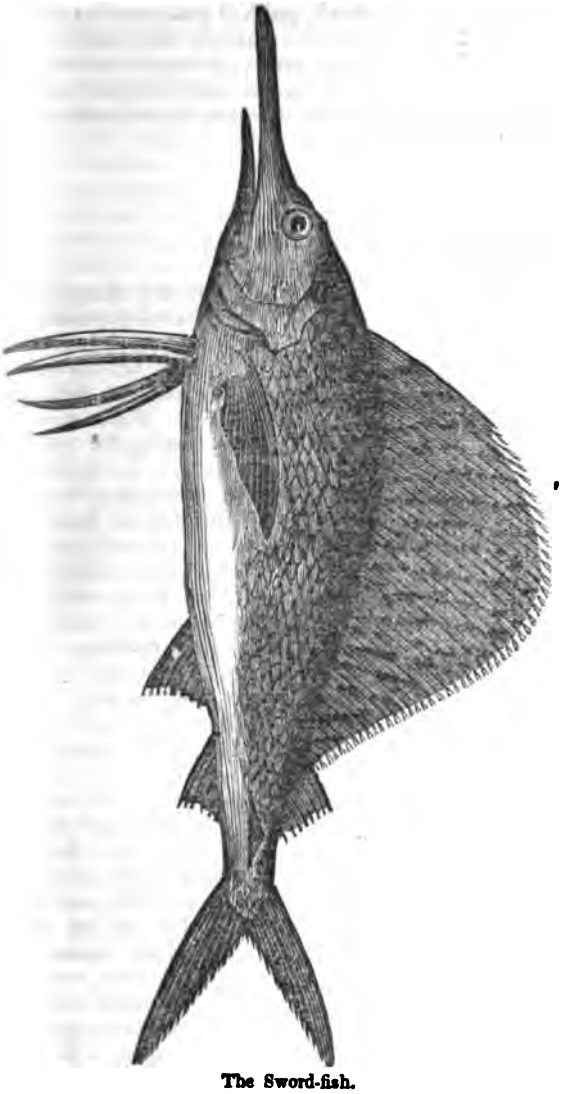
The species, of which there are more than a hundred discovered, are many of them formed after the most elegant patterns. Our illustration offers an example of one of the most beautiful. They vary in size, from an inch to three feet or more in diameter; and in the number of their rays, from five to upward of a hundred. Some have the rays split into delicate branches, which ramify and twist into each other in a style which far surpasses the most complicated Gothic tracery. Eight thousand branches have been counted in the arborescent sea-star of the Indian Ocean.

THE SWORD-FISH.

The name of the Sword-Fish has been given to this singular creature, from the lengthened form of its upper jaw, the extremity of which is prolonged in such a manner as to resemble a sword. In some parts of France it has acquired the name of the emperor, because they say it resembles the Roman emperors, who are represented with a sword in the hand. This fish is extremely large and powerful, being from twelve to eighteen feet in length; of its amazing strength the following anecdote is sufficient evidence:—

Van Schouten, in his voyage round the world, about the beginning of the seventeenth century, states that "a great fish, or sea-monster, having a horn like an elephant's tooth, except being full and not hollow, struck the ship with such great strength, that it entered into three planks of the ship, two of green and one of oaken wood, and into a rib, where it turned upward, to their great good fortune."

In the year 1725, in refitting the British ship Leopard after her return from the West Indies, the ship-wrights found in her bottom part of the sword of one of these fishes. From the direction in which the sword lay, the fish is supposed to have followed the ship when under sail; it had penetrated through the sheathing, which was an inch thick, passed through three inches of plank, and beyond that, four inches and a half into the timber. The force requisite to effect this (since the vessel was proceeding in a direction from the fish) must have been excessive. The workmen declared it impossible, with a hammer of a



The Sword-fish.

quarter of a hundred weight, to drive an iron pin, of the same form and size, to the same depth, in less than eight or nine strokes, while this had been effected by only one.

In Europe the chief resort of the sword-fish is the Mediterranean Sea, where it is found in great numbers; but although not so plentiful, it is far from an uncommon visiter on the French and Spanish coasts: in the British seas it is seldom met with.

In America the sword-fish is by no means uncommon, on the coast of the Eastern States. The taking of the sword-fish is said to be better sport than that of the tunny. A man in the rigging of the vessel, or on a neighboring rock, gives notice of its approach; it is then attacked with a small harpoon, attached to a long line. It is, in fact, merely whale fishing in miniature. Sometimes the harpooner has to wait for hours together before it comes in sight. The Sicilian fishermen, who are extremely superstitious, chant a certain ditty, (supposed to be a Greek sentence.) Cuvier, however, says it is an assemblage of words belonging to no language, which they look upon as a charm to attract the sword-fish to their boat. This is the only bait they use: and they pretend that it is most wonderfully efficacious, and obliges the fish to follow them. On the other hand, if unfortunately it should hear them pronounce a single Italian word, it dives at once, and is never heard of again. Oppian speaks of a very singular method of taking these fish, by forming a boat so as to resemble the sword-fish itself, for the purpose of deceiving them.

There is at present in the British Museum part of the sword of this fish, buried in a piece of wood which once formed part of a vessel; it was broken

from the living fish by the violence of the shock, and had penetrated so deeply, that but for this lucky accident the ship would to a certainty have sunk.

To account for this attack on these inanimate masses, it is to be remembered that the sword-fishes, naturally waging war with whales, and the larger kinds of *Cetacea*, may very likely mistake the hull of the vessel for the enormous body of one of these huge creatures.

SEA PORCUPINE OF AMERICA.

Sea Porcupine of America.

This fish takes its name from its being armed with spines. It varies in dimensions from the size of a foot-ball to that of a bushel. When enraged, it blows up its body as round as a bladder, by means of a sort of air-bag in its interior. In addition to the spines, which are longer on the sides than on the back and belly, some species have a sort of bony covering on the head. The head is small; the eyes are large, with a black pupil and yellow iris; and the nostrils are near the eyes. The aperture of the gills is crescent-shaped, and close to the pectoral fin. The back is of a bluish color; the sides and belly are white. The fins are all short, with black spots and branched rays; and the belly is covered with light and dark brown spots.

This species is often found in America, and sometimes in the Red Sea, and near the shores of Japan. At New York, where it appears only in the summer months, it goes by the name of goad-fish; and the inhabitants catch them merely for amusement. They throw in a line baited with the

tail of a sea-crab; the fish approaches, but, being afraid of the line, he makes several turns and trials round the bait, and at length nibbles at it, but pretends to reject it, and passes by, striking it with his tail, as if he did not regard it. But if the rod be kept steady he presently turns back, seizes the bait, and swallows hook and all. When he finds himself taken, he becomes enraged, bristles up his spines, swells out his belly, and endeavors to wound every thing that is near him. Finding this of no avail, he resorts to cunning, and seems to submit: he lowers his spines, contracts his body, and lies like a wet glove. But this artifice not succeeding, and perceiving the fisherman dragging him toward the land, he renews his defensive attitude with redoubled fury. His spines are now vigorously erected, his form rounded, and his body so completely armed at all points, that it is impossible to take it by the hand; he is therefore dragged to some distance, where he struggles and quickly dies.

THE SEAHORSE.

These curiously-formed fish have obtained this name, from their resemblance, when they have been dried, to the outline of a horse's head in miniature.

The specimen here figured is represented in a dried state, and from its singular appearance, it is frequently found in the cabinets of the curious. It is taken in almost every quarter of the globe, and is generally from six inches to a foot in length: in color it varies much, according to the climate in which it is taken, being sometimes of a bluish lead-color, at others brown, or a greenish black: instead of being covered with scales, its whole body is enclosed in a series of hard rings, covered with numerous spines and hairs.

The ancients, attracted, perhaps, by its singular form, attributed many wonderful properties to it, which, with greater or less absurdity, have been related by most of their authors. At the present day, in Dalmatia, it is supposed to possess several healing properties, while, on the other hand, the Norwegians consider it a poison.

THE STING-RAY.

It would be almost an endless task to enumerate all the animals to which dangerous and fatal properties have been attributed by the ignorant; and even now, though experiment after experiment has been made, proving the falsehood of the greater part of these assertions, many exist, who, fond of the marvellous, and unwilling to relinquish old prejudices, still believe in all these wonderful tales. We quote from an old author a prose description of this fish, in which its dangerous qualities are exaggerated.

"The inhabitants of the sea that are large enough to devour men are very many, but those which have a power of hurting otherwise, more than by the absolute wound of their bite, are very few. In the first place among these, however, is to stand the fierce-flair, or fireflair, as it is commonly called.

"The tail is the creature's weapon of defence, but it is a mischievous fish, and will use it offensively. The method in which it does this, is by drawing the tail swiftly round the person's leg or body, as a man of judgment would draw the long lash of a hunting-whip to make it cut; and it thus strikes the end of the bone deep into the flesh."

The large notched bone beneath the tail of this creature is capable, no doubt, of inflicting a severe wound; but in this consists all the danger, and the poisonous qualities supposed to belong to it are merely imaginary. The sting-ray is found in almost every part of the world; in the European seas it seldom attains a large size, but in some parts of the world, particularly New Holland, it is found weighing as much as four hundred pounds.

In some parts of America, the notched bone of this fish is used instead of a saw

VEGETABLE KINGDOM.

THE VINE AND VINTAGE.

Not only do the opinions of individuals in wine countries differ very widely upon the management of the vintage, but in some the period of the gathering is regulated by authority, as if the vine-grower was not the best judge of the state of his produce, and did not know when his property was in the best order for yielding him a profitable return. The signs which usually regulate it are observed in the south of Europe about the end of September, or commencement of October. In the north, the fear of autumnal frosts, which injure the unripe grape, makes the seizure of the exact moment proper for the vintage a matter of great importance.

The time of the vintage being fixed, it is begun as early in the day as possible after the sun has dissipated the dew. The red grape is generally ripe before the white. In the north, they are not so particular respecting the dryness of the fruit

when gathered as in the south; in fact, it is often gathered, in the north of France, with the dew upon it. The gathering is uniformly continued with as much rapidity as possible, if the weather continue fair, so as to terminate the pressing in one day. If this cannot be done, the vintage is suspended, for the fermentation in a warm, or even a moderate temperature, is far more energetic than in cold, damp weather. It ruins the durability of the wine if the fruit is gathered and fermented at such a time.

The fruit in some countries is cut off the plant with a knife; in France, the scissors are used, by which the stems of the branches are rapidly severed. In ruder countries, the hand only is applied, a mode injurious to the grape as well as to the vine. The most approved plan is to make three separate gatherings of the fruit. The *first* includes all the finest and ripest bunches. The green, rotten grapes, or such as have been eaten into by insects, are cleared from the bunches, which are then carefully carried home. The *second* gathering implies, naturally, a second pressing. The grapes are not quite as ripe as the first. The *last* gathering and pressing consists of the inferior grapes. The gathered bunches are deposited as lightly as possible, to prevent the grapes from being bruised. All dry or spoiled grapes are cast aside, where proper care is used, as fine or delicate wine is intended to be made. Each laborer places his gathering in an osier basket, or in a sort of wooden dosser, carried with the least possible motion. In France, in the department of the Marne, the grapes are carried on horseback covered with cloths. The grapes in some countries are plucked from the bunches; in others, they are placed entire in the press, stems and all. The best grapes only are used for making the better kinds of wine. The astringent principle lodged in the stems is thought to be beneficial, and to impart to the wine a capacity of endurance or long keeping. When picked, it is only for red wine, and is generally done by the hand. White-wine grapes are rarely picked from the clusters.

Grapes were anciently trodden out, after being exposed, on a level floor, to the action of the solar rays for ten days; they were then placed in the shade for five days more, in order to mature the saccharine matter. This practice is still followed in some of the islands of the Greek Archipelago, at St. Lucar in Spain, in Italy, at least in Calabria, and in some of the north-eastern departments of France. The fermentation is facilitated greatly by this process. In some parts of France a laborer with sabots treads the grapes out as they come from the vineyard, in a square box, having holes in the bottom, and placed over a vat,—a very barbarous method. The murk is then removed, and he proceeds with fresh grapes till the vat is full. Sometimes they are squeezed out in troughs, by naked men, using both sabots and hands at once.

The wine-press differs in construction in different countries. There are several kinds. For red wine, the grapes are trodden before they are pressed, in order to disengage the coloring matter from the skins; but in making white wine, this operation is never performed. In either case, where the press is applied, the first pressing is despatched as quickly as possible.

At first the press is used gently, that the wine may not overflow. The pressure is then gradually increased, until the murk becomes moderately compressed. This is the first pressing. The grapes that did not sustain pressure, being scattered over the edges of the heap, are now gathered up, the press relaxed, and being placed upon the murk, the press is tightened again. The wine from this is called of the second pressing. The edges of the whole mass are now squared down with a cutting instrument, so that the mass of fruit is reduced to the form of an immense oblong cake, upon which the cuttings of the edges are heaped, and the press worked again, which makes wine of the third

pressing, or, as the wine-maker calls it, *wine of the first cutting*. The pressing and cutting are repeated two or three times, and what liquid flows after is called among the laborers wine of the second or third cuttings.

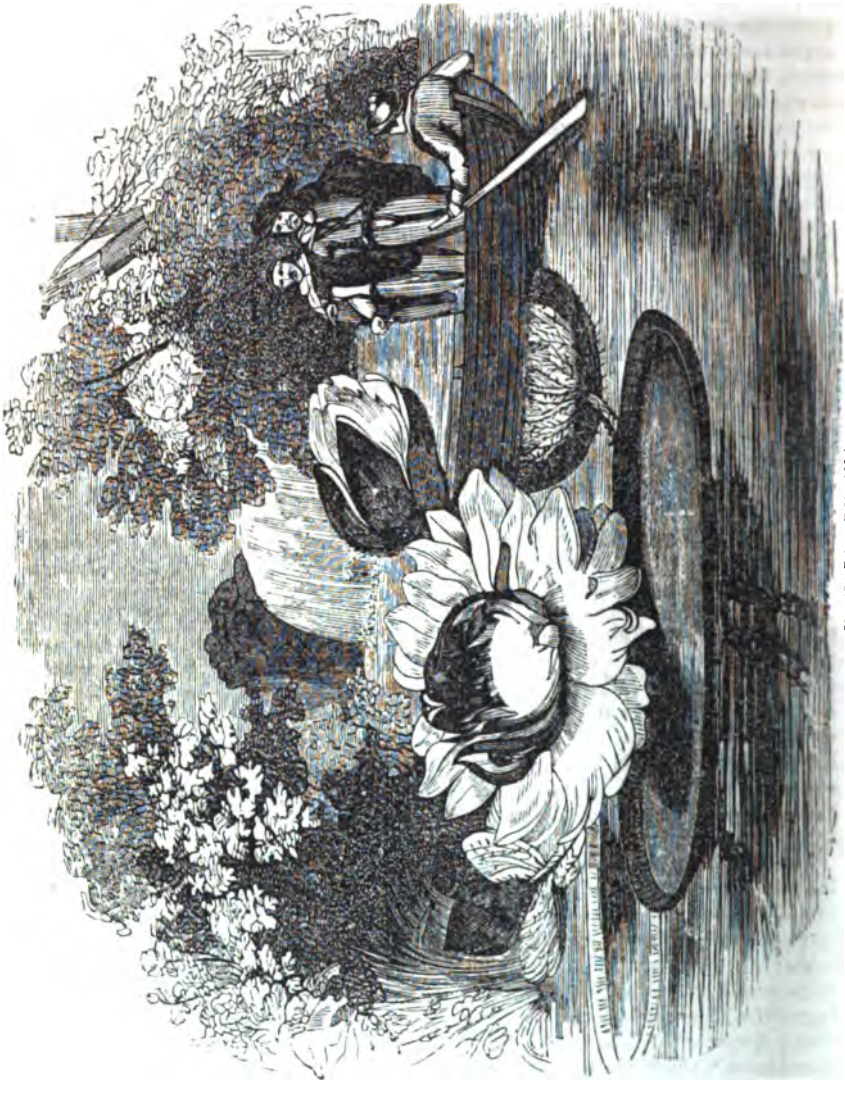
The great wine-press is capable of making no less than twenty-five pieces of wine in four hours. Where vineyards are extensive, as it is desirable to press the produce of the gathering in one day, however large in quantity, this press is useful; but it is the instrument of making a large quantity of secondary wine, rather than a little of a choice character, and is used principally by the larger vine-growers. There is only one species of wine which is made without beating, treading, or pressing; this is what they call in Spain *lagrima*. The grapes, melting with ripeness, are suspended in bunches, and the wine is the produce of the droppings. This can only be effected with the *muscatel* grape of the warm south. In this way the richest Malaga is made. In Cyprus the grapes are beaten with mallets, on an inclined plane, with a reservoir at the end.

VICTORIA REGINA.

[See page 294.]

The forests and rivers of Guiana present an almost unexplored field for scientific research. Mr. Waterton, in his amusing "Wanderings," has done something to render their varied treasures familiar to the public; and one might have thought that his book of itself was sufficient to tempt hundreds to tread in his footsteps. But it is not every naturalist or botanist who can kill a "modern Python," or ride "on the back of a cayman close to the water's edge." Although some persons may think that a few of this traveller's lively descriptions have a tinge of the marvellous, one cannot but sympathize with that genuine adventurous spirit in which he travelled the magnificent forest of Demarara and Essequibo. "Alone and barefooted," he tells us, "I have pulled poisonous snakes out of their lurking-places; climbed up trees to peep into holes for bats and vampires, and for days together hastened through sun and rain to the thickest parts of the forest to procure specimens I had never got before. In fine, I have pursued the wild beasts over hill and dale, through swamps and quagmires, now scorched by the noonday sun, now drenched by the pelting shower, and returned to the hammock to satisfy the cravings of hunger, often on a poor and scanty supper."

Dr. Hancock, in a little pamphlet on the "climate, soil, and productions of British Guiana," says: "This new world of vegetables has never been explored or investigated: many of the plants, indeed, have been made known botanically, that is to say, so far as mere descriptive botany goes, or the notation of external forms." "Not only," he adds, in another place, "in respect to numberless products useful in medicine and the arts, but likewise numerous fruits and nutritive vegetables, Europe has yet to become acquainted with these fruitful regions of South America." The following engraving shows that there are also most extraordinary "vegetable wonders" to be found in Guiana. The two engravings have been copied from the original drawings, by permission of the Botanical Society. This new genus, which is allied to the water-lily, has been named "Victoria Regina," by permission of the Queen. Its discoverer, R. H. Schomburgk, Esq., transmitted the original drawings and a description to the London Botanical Society. His communication, which was read at a meeting of the society on the seventh of September, 1837, is dated "New Amsterdam,



VICTORIA REGINA.

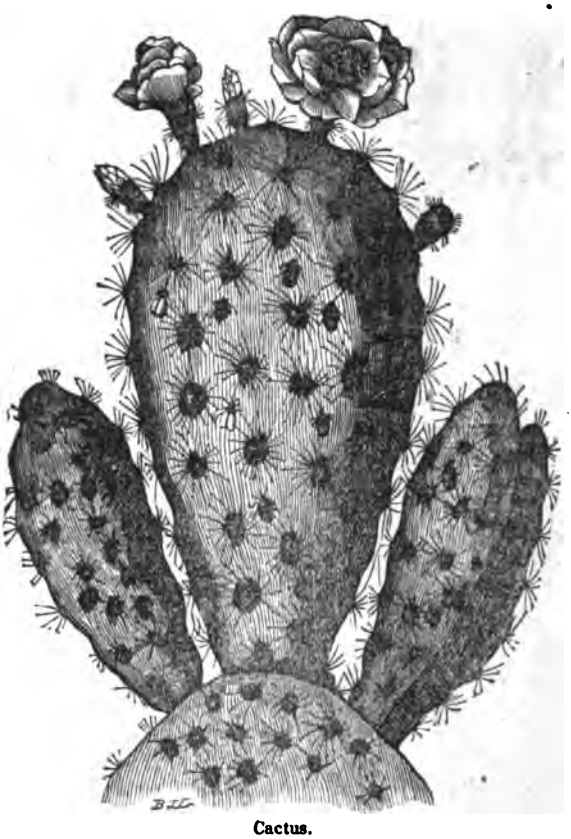
Berbice, May eleventh, 1837." New Amsterdam, the capital of an almost unknown British colony, stands on the east bank of the Berbice river.

Mr. Schomburgk says: "It was on the first of January this year, while contending with the difficulties nature opposed in different forms to our progress up the river Berbice (in British Guiana), that we arrived at a point where the river expanded and formed a currentless basin: some object on the southern extremity of this basin attracted my attention—it was impossible to form any idea what it could be, and animating the crew to increase the rate of paddling, shortly afterward we were opposite the object which had raised my curiosity—*a vegetable wonder!* All calamities were forgotten: I felt as a botanist, and felt myself rewarded. A gigantic leaf, from five to six feet in diameter, salver-shaped, with a broad rim of a light green above, and a vivid crimson below resting upon the water: quite in character with the wonderful leaf was the luxuriant flower, consisting of many hundred petals, passing in alternate tints from pure white to rose and pink. The smooth water was covered with them: I rowed from one to another, and observed always something new to admire. The leaf on its surface is of a bright green, in form orbiculate, with this exception opposite its axis, where it is slightly bent in: its diameter measured from five to six feet: around the margin extended a rim, about three to five inches high, on the inside light green, like the surface of the leaf, on the outside like the leaf's lower part, of a bright crimson. The stem of the flower is an inch thick near the calyx, and is studded with sharp elastic prickles about three-quarters of an inch in length. The calyx is four-leaved, each upward of seven inches in length, and three in breadth at the base; they are thick, white inside, reddish-brown and prickly outside. The diameter of the calyx is twelve to thirteen inches: on

Under side of the leaf.

it rests the magnificent flower, which, when fully developed, covers completely the calyx with its hundred petals. When it first opens, it is white with pink in the middle, which spreads over the whole flower the more it advances in age, and it is generally found the next day of a pink color; as if to enhance its beauty, it is sweet-scented: like others of its tribe, it possesses a fleshy disk, and petals and stamens pass gradually into each other, and many petaloid leaves may be observed, which have vestiges of an anther. We met them afterward frequently, and the higher we advanced the more gigantic they became: we measured a leaf, which was six feet five inches in diameter, its rim five and a half inches high, and the flower across fifteen inches. The flower is much injured by a beetle (*Thrincius* species ?) which destroys completely the inner part; we have counted from twenty to thirty in one flower."

CACTUS.



Cactus.

THE *Cactus* or melon-thistle, is a genus of stove succulents, natives of the driest parts of tropical countries. Linnæan class and order, *Icosandria Monogynia*; natural order, *Cacteæ*. Generic character: calyx bell-shaped, imbricated; corolla, petals six or more inserted on the calyx; stamens numerous, joined to the calyx; filaments awl-shaped; anthers oval, and two-celled; stigma many cleft, berry many seeded. These plants being of remarkable character attracted the notice of travellers in South America, where they are chiefly found, and being tenacious of life, were easily transported to Europe and to the United States, where some of them have been long cultivated in hot-houses. They are mostly destitute of leaves, and composed of thick fleshy stems entire or jointed, and of the most grotesque shapes. They are spiny; either ranged along the prominent angles of the stem, or growing in tufts on the surface. The

Turk's cap (*C. melocactus*) is a regularly formed and curious production; the body being ribbed like a melon, with tufts of short spines along the angles, and bearing its flowers and fruit round the upper part of the tassel of the cap. Full-grown plants are sometimes met with in the West Indies two feet in diameter. The interior is a soft green pulp, very full of moisture, and never changing to a woody consistence. The fruit of some of them is eatable, and resembles, in shape and size, the fig of Europe. This genus, which formerly comprised a great many plants supposed to be species, is now so much divided, that very few real cacti remain.

THE LARGE FLOWERING SENSITIVE PLANT.

The Sensitive Plant.

This splendid shrub grows wild, both in the East and West Indies. It is frequently found in the mountains of Jamaica, and was introduced into England in 1769, by Mr. Norman. It belongs to the same tribe as the common sensitive plant, but does not possess the power of closing its leaves at the approach of danger, in nearly so high a degree as its less splendid companion. We must all have noticed the folding back of the leaves, and the rolling up of the flowers, of many well-known plants in the evening, or at the approach of rain, and their subsequent expansion in the morning, or after the passing by of the shower. But the sensitive plants include within themselves a power of motion far exceeding this, and approaching, in appearance, the voluntary movements of an animal. The origin of this singular power has never yet been discovered, although numerous experiments have been made to ascertain the fact. These experiments

all tend to demonstrate the infinite variety of ways in which the Creator of all things has furnished every object of his creation with the means of self-preservation.

We have already alluded to the periodical closing of the leaves of plants: the same motion takes place in the sensitive plants, but the wonderful fact in the history of the latter is, that this movement can be produced at any time; and by merely touching the leaves gently, they will instantly recoil, and fold themselves together, as if for self-protection; and, at the same time, the small twig which sustains the leaves approaches the main stem. If the touch has been forcible, not only the twig supporting one series of leaves is affected, but the same effects take place in the compound leaf on the opposite side of the stem, and this motion is sometimes communicated to the whole plant.

It is very difficult to touch the leaf of a healthy sensitive plant so lightly as not to make it close: after the leaves are closed, some time elapses before they regain their original position, and the duration of this interval depends on the time of day, the season of the year, and the more or less healthy state of the plant. It seems, however, that light is an agent necessary to the production of some of these movements.

In the month of August, a sensitive plant was carried in a pot from its usual situation, into a dark cave; the motion it received in carriage caused it to close its leaves, and they did not open until four-and-twenty hours afterwards; by this time they had become moderately open, but were afterwards subject to no changes at night or morning, remaining three days and nights with their leaves in the same state. At the end of this time it was brought out again into the air, where the leaves recovered their natural periodical motions, shutting every night, and opening every morning, as naturally and strongly as ever; but although, while in the cave, their periodical motions were suspended, they shrunk from the touch with almost as much power as when in the open air.

Although a sensitive plant is, as we have seen, easily affected by the slightest touch, and closes when subjected to a heavy fall of rain, it remains unmoved if only exposed to a gentle shower. If the leaves are touched with sufficient force, the branches are also affected, but it is possible, if the experiment is carefully performed, to cause the branch to move towards the stem, the leaves still remaining in their original position with reference to each other; thus proving that the power of motion belonging to each part of the plant is independent of that possessed by any other part.

THE PITCHER-PLANT.

There is not, perhaps, among the numerous examples that occur of the provident economy of nature in the vegetable part of the creation, a more remarkable instance of contrivance adapted to circumstances, or of means suited to the end, than that which is displayed in this wonderful plant, the *Nepenthes distillatoria*, or Pitcher-plant.

Being the inhabitant of a tropical climate, and found in the most stony and arid situations, Nature has furnished it with the means of an ample supply of moisture, without which it would wither and perish. To the footstalk of each leaf, and near the base, is attached a small bag, shaped like a pitcher, of the same consistence and color of the leaf in the early stage of its growth, but changing with age to a reddish-purple; it is girt round with an oblique band or hoop, and covered with a lid neatly fitted, and moveable on a kind of hinge or

The Pitcher-plant.

strong fibre, which, passing over the handle, contracts the vessel with the leaf. By the construction of this fibre the lid is drawn open whenever the weather is showery or dews fall, which would appear to be just the contrary of what usually happens in nature, though the contraction is probably occasioned by the hot and dry atmosphere, and the expansion of the fibre does not take place till the moisture has fallen and saturated the pitcher. When this is the case, the cover falls down and closes so firmly as to prevent any evaporation from taking place.

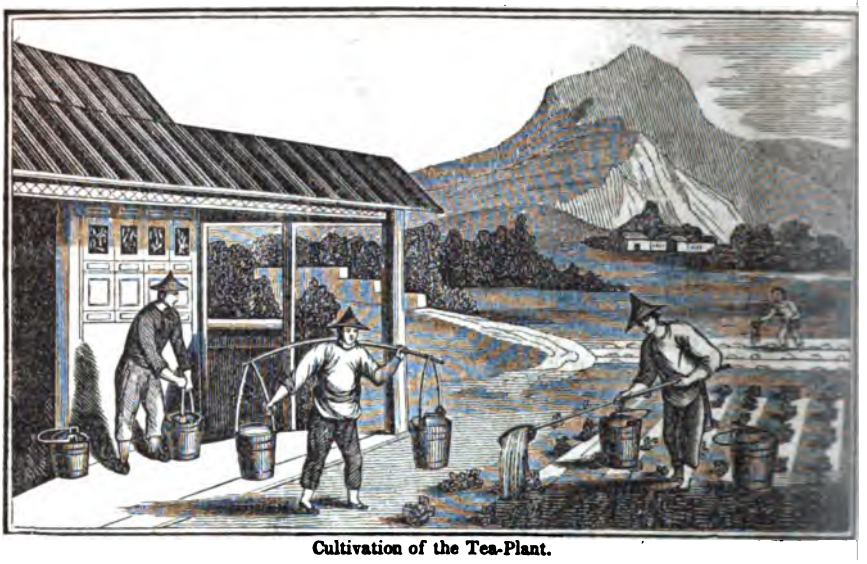
The water being gradually absorbed through the handle into the footstalk, gives vigor to the leaf and sustenance to the plant. As soon as the pitchers are exhausted, the lids again open to admit whatever moisture may fall, and when the plant has produced its seed, and the dry season sets in, it withers, and all the covers of the pitchers stand open.

Can any thing more than the mechanism of this singular production, evince the Divine benevolence?

TEA.

[See pages 300, 302.]

The tree, or rather shrub, from the leaves of which that refreshing and now indispensable beverage called Tea is made, is a native of China and Japan, in which countries alone it is cultivated for use. It is an evergreen, somewhat resembling the myrtle in appearance, and grows to a height varying between three and six feet. It is capable of enduring great variations of climate, being cultivated alike in the neighborhood of Canton, where the heat is at times almost insupportable to the natives; and around the walls of Pekin, where the winter is not unfrequently as severe as in the north of Europe. The best sorts, however, are the production of a more temperate climate; the finest teas are said to be grown in the province of Nankin, occupying nearly the middle



Cultivation of the Tea-Plant.

Gathering the Leaves of the Tea-Plant.

Tea Plant.

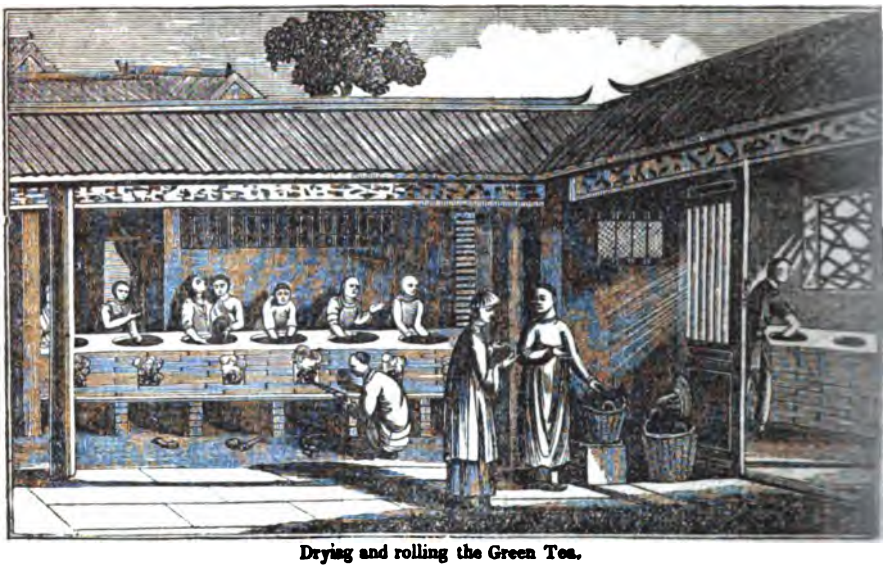
station between the two extremes mentioned above; and the greatest portion of what is brought to the Canton market, and sold to the European merchants, is the produce of the hilly, but populous and industrious, province of Fokien, situated on the seacoast to the north-east of Canton. It appears to thrive best in valleys, or on the sloping banks of hills, exposed to the southern sun, and especially on the banks of rivers or rivulets.

The first European writer who mentions tea is Giovanni Botero, an eminent Italian author, who published a treatise, about the year 1590, on the causes of the magnificence and greatness of cities. He does not mention tea by name, but he describes it in such a manner, that it is impossible to mistake it. "The Chinese," he says, "have an herb, out of which they press a delicate juice, which serves them for drink, instead of wine: it also preserves their health, and frees them from all those evils which the immoderate use of wine produces among us."

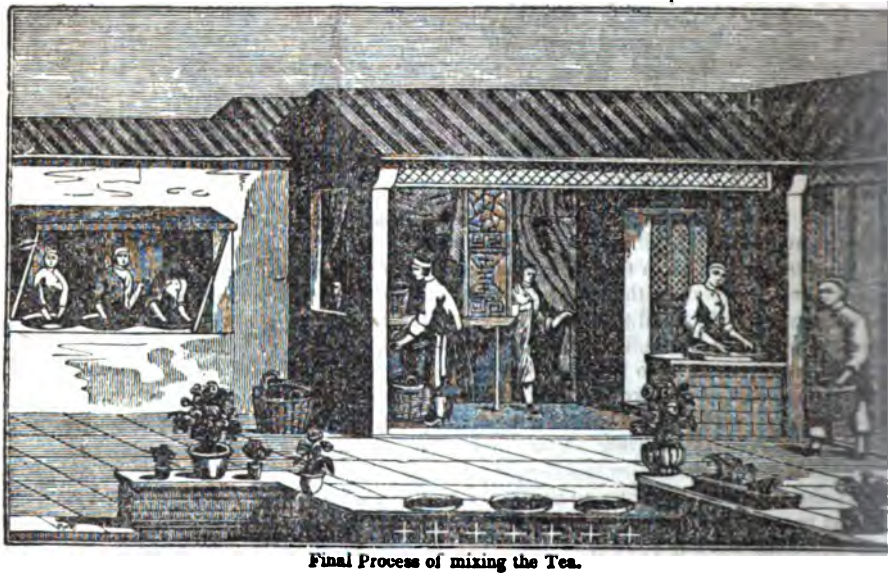
The tea-plant is propagated from the seed, and the manner of sowing it is represented in page 300.

Holes are drilled in the ground at equal distances, and in regular rows; into each hole the planter throws as many as six, or even a dozen seeds, not above a fifth part of the seed planted being expected to grow. While running to maturity, they are carefully watered; and though, when once out of the ground, they would continue to vegetate without further care, the more industrious cultivators annually manure the ground, and clear the crop from weeds.

Amongst other stories relative to the tea-tree, it has been said that some of the finest specimens grow on the precipitous declivities of rocky mountains, where it is too difficult or too dangerous for human beings to gather them; and that the Chinese, in order to procure them, pelt a race of monkeys, which inhabit those inapproachable recesses, with stones, provoking them to return the compliment with a shower of tea-branches. This story, however, refutes itself: the tea-plant, whose leaves are worth gathering for home use or for commerce, is a cultivated, not a wild plant; and where man could not approach to gather, he certainly could neither sow, water, nor manure.



Drying and rolling the Green Tea.



Final Process of mixing the Tea.

The leaves of the tea-plant are not fit for gathering until the third year, at which period they are in their prime, and most plentiful. When about seven years old, the shrub has generally grown to about the height of a man, and its [illegible] become few and coarse; it is then generally cut down to the stem, [illegible] in the succeeding summer, produces an exuberant crop of fresh shoots [illegible]; this operation, however, is sometimes deferred till the plant is ten [illegible] old.

The process of gathering the tea, as represented in page 300, is one of great [illegible] and importance. Each leaf is plucked separately from the stalk; the [illegible] of the gatherer are kept carefully clean, and, in collecting some of the [illegible], he hardly ventures to breathe on the plant. At a place called Udis, [illegible] island of Japan, is a mountain, the climate of which is supposed to be [illegible] congenial to the growth of tea, and the whole crop which grows [illegible] is reserved for the sole use and disposal of the emperor. A wide and [illegible] ditch round the base of the mountain prevents all access, except to the [illegible] guardians of its treasures. The shrubs are carefully cleansed of [illegible], and protected from any inclemency of the weather. The laborers who [illegible] the leaves, are obliged, for some weeks previous, to abstain from all [illegible] food, lest their breath or perspiration might injure the flavor; they wear [illegible] gloves while at work, and during that period bathe two or three times a [illegible].

Notwithstanding the tediousness of such an operation, a laborer can frequently [illegible] from four to ten or even fifteen pounds a day. Three or four of these [illegible] take place during the season; viz., towards the end of February or [illegible] of March; in April or May; towards the middle of June; and in [illegible]. From the first gathering, which consists of the very young and tender [illegible] only, the most valuable teas are manufactured; viz., the green tea called [illegible], and the black tea called Pekoe. The produce of this first gather[illegible] is also denominated in China, Imperial tea, probably because where the [illegible] is not cultivated with a view to supplying the demands of the Canton [illegible], it is reserved, either in obedience to the law, or on account of its supe[illegible] value, for the consumption of the emperor and his court. From the second [illegible] crops are manufactured the green teas, called in our shops Hyson and [illegible], and the black teas denominated Souchong and Congou. The light [illegible] leaves separated from the Hyson by winnowing, form a tea called [illegible], much in demand by the Americans, who are also the largest gen[illegible] purchasers of green teas. On the other hand, some of the choicest and [illegible] leaves of the second gathering, are frequently mixed with those of [illegible]. From the fourth crop is manufactured the coarsest species of black [illegible] called Bohea; and this crop is mixed with an inferior tea, grown in a dis[illegible] called Wiping, near Canton; together with such tea as remained unsold [illegible] season.

[illegible] to the minute division of land in China, there can be few, if any, [illegible] tea-growers; the plantations are small, and the business of them carried [illegible] the owner and his own family, who carry the produce of each picking [illegible] to market, where it is disposed of to a class of persons whose busi[illegible] is to collect and dry the leaves, ready for the Canton tea-merchants.

The process of drying, which should commence as soon as possible after the [illegible] have been gathered, differs according to the quality of the tea. Some [illegible] only exposed under a shed to the sun's rays, and frequently turned. The [illegible] represented in page 302, and which we shall now explain, is supposed [illegible] apply only to the green teas.

A drying-house, as represented in page 302, will contain from five to ten or

twenty small furnaces, on the top of each of which is a flat-bottomed and shallow iron pan; there is also a long, low table, covered with mats, on which the leaves are spread and rolled, after they have gone through the first stage of the process, which we may call baking. When the pans are heated to the proper temperature, a few pounds of fresh-gathered leaves are placed upon them; the fresh and juicy leaves crack as they touch the pan, and it is the business of the operator to stir and shift them about as rapidly as possible with his bare hands, until they become too hot to be touched without pain. At this moment he takes off the leaves with a kind of shovel, like a fan, and pours them on the mats before the rollers, who, taking them up by small quantities at a time, roll them in the palms of their hands, in one direction only; while assistants with fans are employed to fan the leaves, in order that they may be the quicker cooled, and retain their curl the longer. To secure the complete evaporation of all moisture from the leaves, as well as the stability of their curl, the operation of drying and rolling is repeated two or three times, or even oftener, if necessary—the pans being, on each successive occasion, less and less heated, and the whole process performed with increasing slowness and caution. The leaves are then separated into their several classes, and stored away for domestic use or for sale. It was, at one time, supposed that the green teas were dried on copper pans, and that they owed their fine green color to that circumstance, which was also said to render a free use of them noxious to the human frame; but this idea is now held to be without any foundation, the most accurate experiments having failed in detecting the slightest particle of copper in the infusion.

After the tea has been thus gathered by the cultivator, and cured and assorted by those who, for want of a better name, we may call tea-collectors, it is finally sold to the "tea-merchants" of Canton, who complete the manufacture by mixing and garbling the different qualities, in which women and children are chiefly employed; the tea then receives a last drying, is divided according to quality, packed in chests, and made up into parcels of from one hundred to six hundred chests each, which are stamped with the name of the district, grower, and manufacturer, and called, from a Chinese word, meaning *seal* or *stamp*, CHOPS.

The use of tea as a beverage in China is of an antiquity beyond record, and is as universal as it is ancient; from the emperor to the lowest peasant or laborer, all alike drink tea, varying only in quality. That consumed by the common people must, however, be not only of an inferior class, but very weak; as the native attendants on Lord Macartney's embassy were continually begging the refuse leaves, which had been already used by the English, because, after pouring fresh water over them, they obtained a better beverage than what they had usually an opportunity of enjoying. On the other hand, some tea presented by the emperor Kien-Long to Lord Macartney was found to want somewhat of the astringency which the British tea-drinker is accustomed to look for and to value in the infusion.

Thrice at least in the day every Chinese drinks tea, but all who enjoy the means have recourse to the refreshing beverage much more frequently; it is the constant offering to a guest, and forms a portion of every sacrifice to their idols. It is made in China, as with us, by pouring boiling water on the dried leaves: but the Chinese use neither milk nor sugar.

COTTON.

Cotton is a soft vegetable down, which is contained in the seed vessels, and envelops the seed of the cotton plant, which grows in most parts of the world, where the climate is sufficiently warm. There are many species of this plant. Mr. Bennet, a cotton cultivator in Tobago, who was an accurate and indefatigable observer of the plant, remarked more than a hundred varieties, and considered them never ending. Of the species already enumerated, it is most probable that some are only varieties occasioned by the different effects of culture, soil, or climate, on a plant which has been under cultivation for so many ages; and it is scarcely possible to determine what plants, so differing, can be regarded as forming separate species, or as being only simple varieties; while at the same time the information of the scientific man is so distinct from that of the practical planter, that it becomes a subject of no small difficulty to combine the knowledge obtained from each into one accordant whole.

To the cotton planter it is a matter of much interest to become acquainted with all these distinctive varieties, as some are incomparably more valuable than others, in the quantity and quality of their produce. Some yield their downy harvest twice in the year, others only once. Some bear cotton of a long and delicate fibre, and of a beautiful whiteness, while others are found to be short and coarse, and of a bad color. For want of this knowledge, so little regard is in general paid to the selection of the seed, and the improvement of the stock, that the careful cultivator in first forming a plantation is mortified at finding an endless variety among his plants, and can only hope to improve his plantation by his own personal experience, at the cost of much labor and many failures.

Tree Cotton—Gossypium Arboreum.

Among those species which are most remarkable we will mention the *Gossypium arboreum*, or tree cotton, which, if left without being pruned, to luxuriate to its full height, has sometimes attained to fifteen or twenty feet. The leaves grow upon long hairy foot-stalks, and are divided into five deep spear-shaped lobes. This shrub is a native of India.

The *Gossypium Indicum*, or Indian cotton, is another species not very dissimilar to the last; it has not a ligneous stem, and its branches are more hairy, especially at the upper parts. The shape of the leaf likewise differs somewhat from that before described, this being divided into three convex lobes. The stem rises to

the height of ten or twelve feet, and continues in full bearing during several years.

Another species is distinguished by the name *Gossypium religiosum*. No reason is assigned why Linnæus should have bestowed on it so singular a title. The solution of the question was thought to be discovered, on reading in Stedman's Surinam, that the negroes on the coast of Guinea have much veneration for the wild cotton-tree; unfortunately, however, on inquiring farther, we find that the tree associated with religion by the Africans, is the lofty bombax, bearing no similitude to this diminutive plant, but resembling, though far surpassing, our largest oaks in elegance and magnitude. The exalted dimensions and outspreading branches of the African bombax have ensured the favor and reverence in which it is held among a simple people, who, having "no long-drawn aisle or fretted vault" raised for the observances of religion, have consecrated a natural temple, under the ample shade of which their *gadoman*, or priest, delivers his lectures to the assembled audience. The little shrub called *G. religiosum*, only attaining to three or four feet in height, cannot therefore, by the most ingenious conceit, be made to show any connexion with the custom of the natives of Guinea, and we must consent to leave the origin of its present designation in obscurity. Lamarack calls this species *tricuspidatum*. Its stem is upright, of a slight red color, and very hairy. The leaves are sometimes entire, but more frequently divided into three or four not very deep lobes. The flowers grow in a similar manner to the others, but differ in color, being first white, then changing to rose, and finally to red. It is not known of what country this is native. Lamarack believes that it is indigenous to the lowest latitudes of America. Cavanilles supposes that it comes from the Cape of Good Hope. It is cultivated in the Mauritius. There are two varieties of this species—in the one the cotton is extremely white, in the other it is of a yellowish brown, and is the material of which the stuff called nankin is made; it may, therefore, be presumed that this species is a native of China, whence nankin cloths are obtained. The yellowish-brown color of Chinese nankins is therefore the natural color of the cotton, and is not imparted by dyeing. The name is derived from the city of Nankin, to which place the manufacture of these cotton stuffs was peculiar.

Shrubby Cotton.

The color of the nankins was long thought to be artificial, and Braam, who travelled in China with a Dutch embassy at the end of the last century, informs us, that the European merchants sent to request that the nankins for their markets might be dyed of a deeper color than those last received. The fact was,

Cotton.

Cotton; showing a pod bursting.

the Chinese had made the last lighter than usual in consequence of a great and sudden demand, which obliged them to mix their common white cotton with the yellowish brown.

The kind, however, most cultivated in the United States, is the *Gossypium herbaceum.* It is an annual plant, which grows to a considerable height, and has leaves of a bright green color, marked with brownish veins, and each divided into five lobes. The flowers have only one petal in five segments, with a short tube, and are of a pale yellow color, with five red spots at the bottom. The cotton pods are of somewhat triangular shape, and have each three or four cells. These, when ripe, burst open, and disclose their snow-white or yellowish contents, in the midst of which are contained the seeds, in shape somewhat resembling those of grapes. The fibres of cotton are extremely fine, delicate, and flexible. When examined by the microscope, they are found to be somewhat flat, and two-edged or triangular. Their direction is not straight, but contorted, so that the locks can be extended or drawn out without doing violence to the fibres. These threads are finely toothed, which explains the cause of their adhering together with greater facility than those of bombax and several *apocyneæ*, which are destitute of teeth, and cannot be spun into thread without an admixture of cotton.

In the southern parts of the United States the cotton cultivation is distinguished into three kinds—the *nankin cotton*, so called from its color; the *green seed cotton*, producing white cotton with green seed; and the *black seed cotton*. The two first kinds grow in the middle and upper country, and are called *short stapled cotton;* the last is cultivated in the lower country, near the sea, and on the isles near the shore, and produces cotton of a fine white silky appearance, very strong, and of a long staple.

In regard to the cotton district or region of our country, it has been raised in Illinois, and in Pennsylvania, and it is certain that cotton has long been cultivated in St. Mary's county, Maryland, where the *Baltimore* family and their companions made the first settlements, and in Talbot county, in that state, as has been mentioned, and that it was raised during the revolutionary war, in useful quantities to meet the wants of that time, in the southern county of Cape May, in New Jersey. As that county is nearly surrounded by the salt bay of Delaware, and the ocean, it is more generally exempted from frost than land in the same latitude remote from the sea. Cotton has always been steadily raised, though in small quantities for family use, in the County of Sussex, Delaware, on the head waters of the Choptank. The country of the United States, from the 39th degree of lat. to the southern extent of Louisiana cession on the Rio Bravo del Norte, may be considered as the *cotton region* of the United States. These climatorial facts and characteristics are of great importance, and should form a constant subject of reflection and comparison, as to capacities in production, between the United States and all other countries.

The plant of all the three kinds is an annual in the United States, but the perennial may grow in the most southern part of Louisiana, on the Rio Bravo, or in the peninsula of East Florida. The planting season in latitude 32 to 35 degrees, begins in the latter part of March, or early in April. The plough is used to break up the soil, and the drill to plant at distances of about five feet. The quantity of seed for an acre is nearly one bushel. About the middle of June the plants blossom; which is followed by pods, and new blossoms and pods, till the frosts check and destroy the unripe. Just before the middle of September cotton is topped above the lowest blossoms, because, after that time, no blossoms mature to bearing. This gives the sun access, which opens the pods, and the force of vegetation is not wasted in abortive growths. The harvest on the coast begins early in August, and in September is general in the middle and upper country, continuing till December. The wool is picked and put into shoulder bags of the coarsest linen or stuff, and carried to the cotton house, and thence in a few days is spread to dry on a platform, which

prepares the wool for the gin. The sea islands and lower country produce from 100 to 300 pounds per acre. The green seeded is equally or more productive in the upper country, and according to soil, seed, and care, the acre produces from 60 to 300 pounds of clean cotton wool.

FIR TREES.

The Silver-Fir.

THE genus of resinous plants called Abies (the Fir) comprehends many forest trees of great importance. Some of them, such as the larch, the Norway spruce, the silver fir, and the balm of Gilead, are raised in the nurseries annually in the open ground, in large quantities; others, such as the cedar of Lebanon and

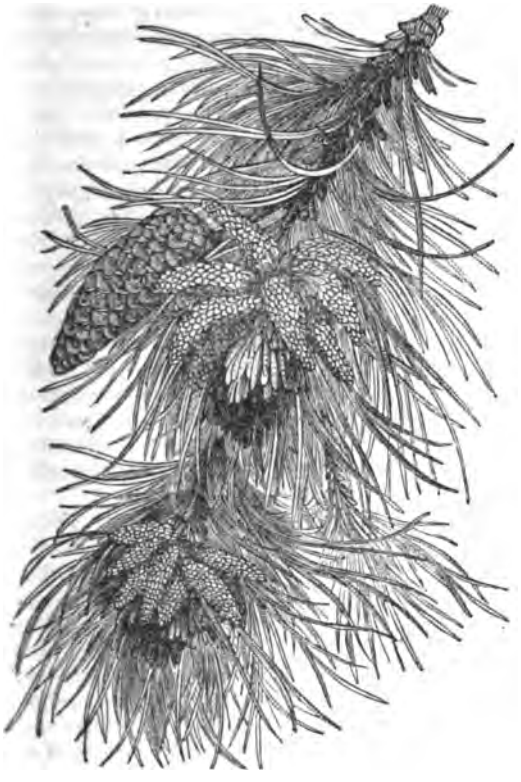
the Douglas fir, are procured in much less abundance, and are treated with more care, being usually kept in pots until they are finally committed to the earth in the situation they may be subsequently destined to occupy.

All the species are increased by seeds; they may also be propagated both by inarching and by cuttings; but it is found that plants so obtained are either very short-lived or stunted, unhealthy, and incapable of becoming vigorous trees. In some of the species, such as the balm of Gilead and the silver fir, the scales of the cones readily separate from their axes, so as to render the extraction of the seeds a simple and easy operation; but in others, such as the larch and the spruce, the scales will neither separate nor open: in such cases it is necessary to dry the cones as much as possible, then to split them by means of an instrument passed up their axes, and afterward to thrash the portions so separated till the seeds can be sifted out.

Like other resinous seeds, these are perishable unless sown within a few months after the cones have been gathered; they will, however, keep much longer in the cone than if separated; wherefore, they should always be imported in that state.

It is usual in the nurseries to sow them in the spring in beds of light soil, in which no recent manure has been mixed; they are buried at various depths, according to the force of the vital energy of the species. This has been found by experience, as it is said, to be one inch for the silver fir; half an inch for the spruce, balm of Gilead, and cedar of Lebanon; a quarter of an inch for the larch; and less for the American spruce: it is, however, probable that these depths are of very little importance. In order to protect the surface of the beds from being dried while the young seeds are sprouting, it is generally overspread with a thin layer of long straw, which is removed as soon as the crop begins generally to appear. During the first season the seedings remain undisturbed; the only attention they receive being to keep them free from weeds. In the following spring the young plants are taken up carefully, and their roots, being a little shortened, are imbedded in rows about six inches apart, where they remain for one or two years. After this they are transplanted into quarters, in rows a foot or nine inches apart, the plants being about six inches from each other.

Pinus Orientalis.



Pinus Larico.

Having remained in this situation for a year, they are fit to be transferred to the plantation, or they may stand two years in the quarters, and then be taken up and replaced in a situation of the same kind, if circumstances should render such a proceeding desirable. On no account, however, should they be allowed to remain in the nursery quarters more than two years at a time without being taken out of the ground, because they are apt to form long and strange roots, which are destroyed in the process of transplantation, so that the life of many must be either materially injured or wholly sacrificed.

None of these firs should be transplanted at a height exceeding three feet, for the reason last mentioned; and the larch is the only one that will remove advantageously even at this size. The spruce and its allied species may be removed more successfully when from a foot and a half to two feet high. To this there is no other exception than that of plants that have been constantly reared in pots, as the cedar of Lebanon; these may be safely removed at any size, if the transplantation is carefully attended to, because their roots are uninjured in the operation. It should, however, be remembered, in finally planting out large firs which have been always kept in pots, that it is absolutely necessary that their roots should be spread out among the earth as much as may be practicable without straining or breaking them; because, while in pots, they necessarily acquire a spiral direction, which they will not afterwards lose unless it is destroyed at the period of final transplantation, and if they do not lose it, they are apt to be blown over by high winds, on account of their roots not having penetrated into the earth far enough in a horizontal direction to form the requisite stay to support the trunk and head.

Where great importance is attached to the raising the seeds of rare species of fir, it has been found a very beneficial practice to place them between two turfs placed root to root, the one upon the other, and to watch them till the seeds begin to sprout; they are then to be sown in the usual way, when every seed will usually succeed.

No trees are more impatient of pruning than these. They exude, when wounded, so large a quantity of their resinous sap as to become weakened even by a few incisions; and, if they have suffered many, they are long before

Pinus Halpensis.

they recover from the effects. So great is their symmetry, and so uniformly will their branches form under favorable circumstances, that it will rarely happen that a necessity for the use of the pruning knife can arise. The great rule to be observed in their management is, to allow them ample room for the extension of their branches; if this is attended to, their beauty is not only ensured, but the rate at which they will form their timber will be an ample recompense for the space they may occupy.

The Oriental Fir, (Pinus Orientalis,) has the leaves very short, uniformly imbricated, quadrangular, with a point. Cones ovate, cylindrical, pendulous, their scales somewhat rhomboid. It was found by Lambert, in the mountains southeast of Trebisond, above the convent of St. John. It has subsequently been found by Russian botanists in the woods of Mingrelia.

The *P. Laricio*, or Corsican pine, very much resembles the Scotch fir, in appearance as well as in the structure of the cone. The wood is, however, more compact and flexible.

The *P. Halpensis* grew in the neighborhood of Palestine, as its name, derived from Aleppo, indicates.

CATKINS.

A Catkin is a tassel of *male* flowers, destitute of calyx or corolla, in place of which a little scale is produced. These scales, or bractæ, as they are called by botanists, are placed one beneath the other round the stalk of the catkin with the most precise regularity. Each scale covers a number of stamens, which spring from its lower surface, and are shielded by it from wet and too great a degree of light, just in the same way as our readers may have observed the helmet-shaped petal in the common white nettle protects the anthers and stigma which nestle in its concavity. Catkins are, therefore, with the exception of

the willow and some others, clusters of stamen-bearing flowers; but if trees bore no other kind of flowers, we should be destitute in autumn of a great many useful fruits—the nut, acorn, and the like, which are so useful as the winter food of many animals. Our friends must therefore habituate themselves to look for the less showy *female* flowers; but in doing so, they will experience many difficulties. Let us suppose that the hazel is the subject of their investigation; they would have no trouble in pitching at once upon the catkins, or in separating and naming their component parts: all this would be quite easy: but where are the female flowers? Do any of the catkins bear them? They pull a hundred to pieces in vain, and are just on the point of giving up the pursuit, when a little scaly bud near the base of the catkins attracts their attention, from the circumstance of its being crowned with numerous short red threads, but in every other respect looking exactly like the leaf buds with which they had been confounded. These are the pistil-bearing flowers, and the red threads are the stigmas, which catch the pollon from the catkins. Thus far well; but our intelligent friends are not out of the wood yet. They would be justly proud of their discovery, and would certainly feel themselves to be fully competent to discover and investigate both the *male* and *female* flowers of *all* the catkin-bearing trees. We will suppose them, in this spirit, to attack a willow or a poplar; they gather catkin after catkin; but all those of the willow are *males*, and all from the poplar are *females*. This is an awful dilemma, and for the time utterly beyond their solution. The next day they search again, when, lo! the order of yesterday is reversed; the catkins of the willow from which they are now gathering are exclusively *females*, and of the poplar, *males!* Are they mistaken? They take the wisest, and, if all history did not contradict the fact, one would suppose, the most immediate course. They go to the trees which they had examined yesterday, and find their first observations to be quite true. The simple truth then becomes manifest: some trees bear male and female flowers, others only male flowers, and others again only females. This distribution of the sexes is the character upon which Linnæus founded his twenty-first and twenty-second classes. The first, named Monœcia, from *monos*, one, and *oikos*, house;—plants bearing stamens and pistils on the same plant; and the second, Dioœcia, from *dis*, twice, and *oikos*, house;—plants bearing stamens and pistils on different plants.

Nearly four hundred species of trees flower in catkins; and upon this coincidence in their mode of fructification, a natural family has been erected, called AMENTACEÆ, from the word amentum, which is the botanical term for a catkin. In this noble group, all the timber trees of Europe, and most of those of all cold countries, are stationed. Every genus consists of plants important to the wants of man. The alder, the birch, the willow, the poplar, the oak, the chestnut, the hornbeam, the plane, and perhaps the elm, are all collected together in this family. The bark of nearly all the species is furnished with an astringent principle, which has rendered them valuable either for staining black, as in the alder and the oak-gall; or for tanning, as in the oak; or as febrifuges, as the alder, the birch, the oak, most of the willows, and also the Populus tremuloides, which is well known as a tonic and stomachic febrifuge. The fruit of many of the Amentaceæ contains a considerable proportion of fecula, which renders it fit for the food of man and other animals, as the acorns of the oak, the mast of the birch, the nut of castanea and corylus, &c.

This great natural assemblage of trees has been divided, for the convenience of study, and in accordance with certain similarities in their floral structure, into five sub-orders: 1. SALICEÆ, the Salix, or willow tribe, comprising the genera Salix and Populus. 2. BETULINEÆ, the Betula, or birch tribe; comprising

Betula, Alnus, Carpinus, Ostrya, and Corylus. 3. CUPULIFERÆ, or nut-bearing tribe, with cups; comprising Quercus, Fagus, and Castanea. 4. PLATANEÆ, or plane-tree tribe; comprising Platanus and Liquidambar. 5. MYRICEÆ, or candleberry-myrtle tribe; comprising Comptonia, Myrica, Casuarina, and Nageia.

This arrangement, which is very clearly made, is not, however, sufficiently simple for those who are only yet on the threshold of botany, and for whom some less learned classification is necessary. We shall therefore proceed to describe the different genera, with occasional illustrations of their characters, according to the Linnæan method, which proceeds not upon the natural affinities of plants, but upon the number of their stamens, and when that cannot be conveniently followed, as in the present case, upon their sexes.

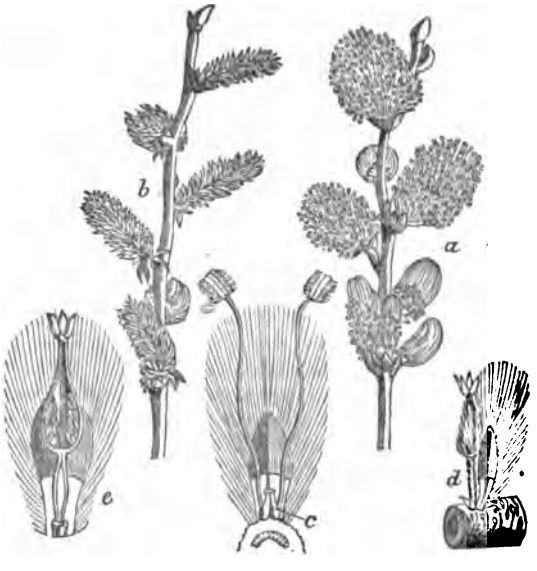
Amentaceous trees may be divided into—

I. Those which bear *dioœcious* flowers, as willow, poplar, candleberry-myrtle, and nageia.

II. Those which bear *monœcious* flowers, as hornbeam, birch, alder, chestnut, beech, oak, hazel, plane, liquidambar, ostrya, comptonia, and casuarina.

To these may be added the elm, which is certainly a catkin bearer, although it differs in so many particulars from the Amentaceæ, as to have made it necessary, in a strictly scientific work, to put it in a different situation. For our purpose, however, it very properly finds a place here.

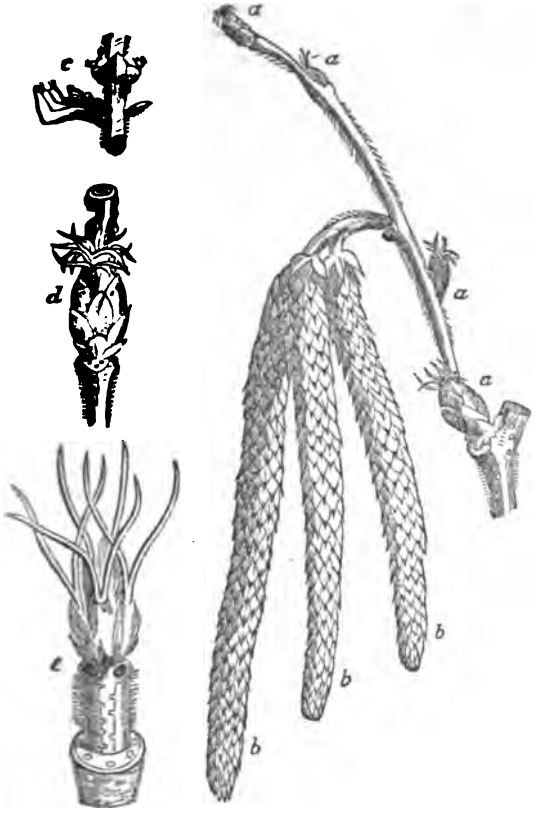
I. DIOŒCIA.



Willow. *Salix caprea.* *a* Male catkins. *b* Female. *c* Male floret, magnified. *d* Female, natural size. *e* The same magnified.

1. *Salix*, the Willow. Of this genus there are one or two hundred species and varieties. Those of salix pentandria and amygdalina, are very large, of a bright red color, and odoriferous. All of them bear a vast deal of cottony down to protect them against cold, which to many birds, and particularly the goldfinch, is of great use as a lining to their nests. The willow tribe is of great service to man. Salix alba affords a very useful timber, and is carried all over the world, together with salix triandra, to afford withes for the basket-maker.

2. *Populus*, the Poplar, called in Rome the arbor populi, or tree of the people. The catkins are full of curious design, and should be very carefully studied: those of the abele tree, or white poplar, are the best for the purpose. This is an elegant and useful genus. They grow rapidly, and produce an abundance of soft wood.



White Poplar. *Populus alba.* *a a a* Buds of female flowers. *b b b* Catkins of males. *c* Bracts, each containing eight stamens. *d* Female bud. *e* Female florets. The three last figures are magnified.

3. *Myrica.* Candleberry-myrtle.

2. *Nageia.*

These are mostly bushy shrubs, natives of almost all parts of the world: they should be sought for in our great nurseries, and carefully investigated. It is wonderful to see how nicely the nearly approaching species are separated from each other. The myrica cerifera is remarkable for the production of a waxen berry, from which candles are sometimes made in this country.

II. Monæcia.

1. *Carpinus*, the Hornbeam. This grows plentifully in hedges, and from March to the end of May, beguiles, by the beauty of its catkins, the walk of the weary but thinking traveller. It derives its name from two Celtic words, *car*, wood, and *pin*, the head—wood for the head, in allusion to its ancient use, (which continues,) for the yokes of cattle.

2. *Betula*, the Birch.

3. *Alnus*, the Alder. By the side of a stream, with a March breeze shaking its catkins, no tree presents a more curious spectacle. The twigs appear to be covered with a host of writhing caterpillars. The fructification, and the differences between the bracts of the male and female catkins, should be carefully distinguished, as, indeed, in all other cases.

4. *Castanea*, the Chestnut. The catkins of the chestnut are extremely curious. The male flowers are arranged in the form of a loose pendulous catkin, which starts from the angle made by the leaf stalk with the branch, called in botanical language the *axilla*, and the catkin is thence said to be axillary. About twenty or more flowers compose a moderately sized catkin. The flowers are without blossoms, having a calyx only, which is cut at the top into six clefts, and carries from five to twenty longish filaments. The anthers at the end of these are large in proportion to their size, and emit a great quantity of pollen. The female flowers are also axillary, but are so altogether unlike what is popularly conceived of a flower, that our little friends will at first find some difficulty in recognising them under such a name. They look like little balls, stuck over

Chestnut. *Castanea vesca.* *a a* Male catkins. *b* Females. *c* Male floret, showing the stamens. *d* Female florets. *e* Pistils from ditto.

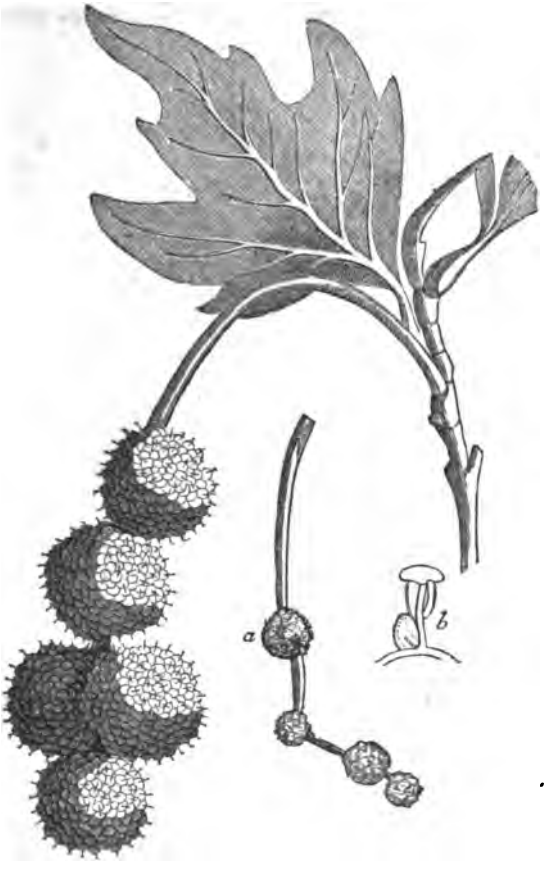
on the outside with sharp thorns, in the manner of a sea-egg, (Echinus,) which commonly ornaments our mantel-pieces. This prickly ball is called by botanists an *involucrum*, and from the circumstance of being covered with thorns, is said to be *thickly muricated* It serves the purpose of a calyx, and encloses three florets. Each of these florets consists of a little urn-shaped cup, in the bottom of which is an ovary or germ of the future nuts, which bears on its summit six awl-shaped styles. Only one of these germs reaches perfection. It is six celled, and contains the embryo of six nuts; but in the course of their growth four of them perish, and two only reach perfection. These are the chestnuts, which, when fully ripe, burst from their thorny enclosure, and fall to the ground.

5. *Fagus*, the Beech. The catkins of the beech usually grow so much beyond reach, that they should be sought for on the ground after a high wind. They differ from most of the preceding in being globular. The female should be studied through the whole of the summer season, and the gradual development of the fruit made the subject of particular observation.

6. *Quercus*, the Oak. The catkin is loose, long, and thread-shaped, and is seldom noticed, as it appears after the leaves, which hide it from observation The "masquerade" of botany, as it has been called, is beautifully exhibited in the structure and growth of the female.

7. *Platanus*, the Plane. This graceful tree bears but very small catkins, and owing to the height at which they grow, are rarely observed by the uninquiring. The clusters of the females, are, however, very large and conspicuous In autumn a very beautiful mast is formed from them, which, after the fall of the leaves, hang like little balls all over the tree, and continue through the winter: *falling only when the ground is ready to receive them.*

8. *Corylus*, the Hazel. The catkins are loose, but covered with perhaps one hundred and fifty scales, beneath each of which there are eight anthers. This



Plane. *Platanus occidentalis.* Twig, with the globular female catkin. *a* Male catkins. *b* Stamen.

enormous provision is necessary to ensure the impregnation of the pistils, which usually standing *above* these, might otherwise have suffered from the want of pollen. But as it is, that fructifying powder is emitted in such quantities, that on a fine sunny day the whole air round the tree is loaded with its golden-colored particles.

9. *Liquidambar.*
10. *Ostrya.*
11. *Comptonia.*
12. *Casuarina.*

These our limits prevent us from describing separately. And we merely notice them that our readers may not forget to get the flowers for their examination. That of ostrya will perhaps please them more than any we have enumerated, and is indeed a very extraordinary production. Liquidambar is so called from a balsam which is produced by the tree, and which is chewed by the Indians. Ostrya, from a Greek word signifying a scale, from the large scales of the catkins. Comptonia, after Henry Compton, Bishop of London, who first cultiva-

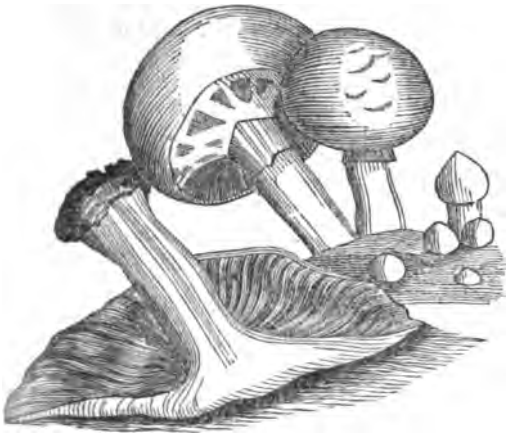
ted it in 1714: and Casuarina, from a supposed resemblance which its branches bear to the feathers of a cassowary.

Common elm. *Ulmus campestris.* *a* Male flowers. *b* Male floret, with the stamens. *c* Branch, with the female flowers. *d* The Stigma of ditto.

We have only now to notice the Elm, (Ulmus,) which, as we have already hinted, has by some been separated from the Amentaceæ, and made the type of a distant family, called Ulmaceæ. The elm bears male and female flowers upon the same tree. The males grow in bunches containing fifty or more florets in each, and are always found on the upper parts of the tree. The females appear after the males have perished, and have their germs curiously winged with a flat and stiff membrane which invests them.

FUNGI—MUSHROOMS, MOSSES, &c.

THE Mushroom production belongs to the well-known tribe of *fungi*. The fungi appear to form the last link in the chain of vegetable life, connecting organized bodies with inorganized matter. "In simplicity of form and structure, they differ widely from the other vegetable tribes, as they present neither leaves nor flowers. Destined to spring up in the midst of corruption, and to draw their nourishment from putrefaction, the fastidious observer turns from them with disgust; and the true naturalist, while aware of their importance in the scale of nature, finding them too perishable in their nature to be easily preserved in his cabinet, too capricious in their growth to be cultivated in his garden, and too sportive in their forms to be successfully delineated with his pencil, leaves them with regret to rot on the dunghill, or to wither in the wood."



The Mushroom.

They were formerly supposed to spring from the glutinous results of putrefied substances, but the wiser views of later philosophers have clearly shown that the impious doctrine of organized bodies being produced from inorganized matter, without the intervention of the creative power of the Maker of all things, is a wicked fallacy, and utterly at variance with all the laws of nature, as far as our limited powers have been able to trace them.

For a long time the seeds of the mushroom tribe remained undiscovered; but recent and more careful observations have shown their existence, though their minute size renders them very difficult of detection. Perhaps no class of vegetables is more widely distributed than that of the fungi; for not only do the *boleti* which are found on decayed wood and on the borders of forests, the toadstools, the puff-balls, and a variety of other larger species, belong to this tribe, but every indication of mouldiness on old leather, badly preserved fruit, mildew, &c., is but a collection of innumerable minute productions of the same nature.

"The fungi exhibit some of the finest colors of the vegetable kingdom. Nature having withheld from this portion of her plants, those flowers which form the chief beauties of the higher orders, and even the leaves with which they are clothed, has profusely scattered her colors over the whole surface of the mushrooms, ornamenting the cap with one color, the gills with a second, and the stem with a third. Let but the lover of natural beauty free his mind from prejudice, and then examine the forms and coloring of the fungi, and he will be compelled to admit that many of them rival, in symmetry and splendor, the rose and the lily, those gaudy ornaments of Flora."

The Toadstool.

Beautiful, however, as some of these vegetable productions are, and useful as other kinds prove to mankind, yet the greatest portion of these tribes are noxious, if not poisonous; and so little difference at times exists between the wholesome and the

deleterious species, that it is with great difficulty they are distinguished. In general, we ought to reject all those which grow on the skirts of woods, and on decayed trees, those whose smell is displeasing, or taste hot to the palate, all those, which, when broken, give out a milky juice, and generally all that are finely colored. In many parts abroad, however, some of the noxious kinds are eaten, after being pickled or boiled; it is said that the poisonous quality is soluble, and therefore extracted by the liquid; however this may be, the experiment is too dangerous to be attempted, and the only kinds of fungi decidedly fit for the table, are the common mushroom, and the champignon.

The four following species of fungi, with the exception of the champignon, are decidedly poisonous.

Agaricus plicatilis.

Agaricus glutinosus.

The Champignon.

Boletus spumosus.

The common mushroom is found in its early state as a *button*. When its cap is in the form of a roundish knop, as in the engraving, and in its adult

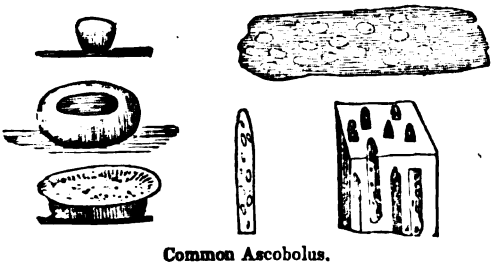
state, when it appears like an inverted saucer; its substance is fleshy, and its gills (the under part) have a pinkish hue, perceptible even when their color is darkened by age; the smell also is agreeable.

The toadstool, on the contrary, which most nearly resembles it, is more flimsy in its texture, exhales an unpleasant odor, and the gills are of a dark color, nearly black, without the least blush of pink, and become almost fluid when bruised between the fingers.

The champignon, the other species of eatable fungus, is not so readily distinguished from many other small sorts; it generally grows in circles, and is of a light-brown color and conical shape, like a cap.

Those, however, who are not accustomed to gather mushrooms, should be extremely cautious in selecting any of the smaller kinds, for the purpose of food. Some people are in the habit of placing a silver teaspoon in the water in which they boil mushrooms, believing, that if they are noxious, the silver will be turned black; but although this may take place in the case of the most hurtful, it is not so certain when applied as a test to the less dangerous kind.

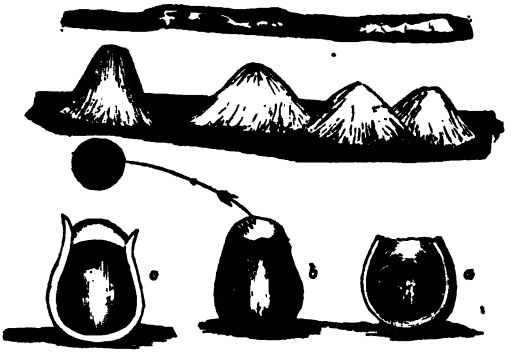
With the assistance of the microscope we are enabled to observe the peculiar structure of singular productions, and to notice the economy of the more minute species. The smaller species of Fungi could never have been properly understood without the aid of the microscope, and, before the invention of that instrument, the appearance they presented when in collected masses was described by the terms canker, mouldiness, &c., terms which conveyed no definite meaning. These minute fungi are constantly found on decaying vegetable and animal substances, or covering the damp walls of cellars and caves, and flourishing in those places which are unfit for the support of the more perfect vegetables. The diseases to which corn and many kinds of grass are subject, have their origin in different species of these parasitic plants.



Common Ascobolus.

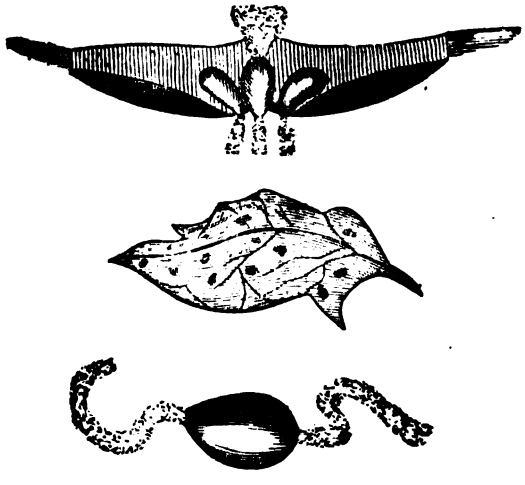
The immense number of species already discovered, and the singular forms they assume, together with the various modes in which they are propagated, renders this order of vegetable productions an endless source of delightful observation to the inquiring mind. We have selected one of the most common species to illustrate this subject, the *Common Ascobolus;* it is met with throughout the whole year. This fungus is of a greenish color, and varies in form according to its age. At first it is a globular substance, about the size of a pin's head; as it increases in age it gradually opens, and forms a kind of cup; at length its upper surface becomes perfectly flat, with the exception of a raised margin; at this period of its growth, the vessels which contain the seeds may be seen like so many minute black specks. One of these vessels, highly magnified, is shown in the engraving: it contains eight oval seeds, or *sporidia;* but the most singular part of the history of this plant, is the manner in which these seeds are distributed: the seed-vessel, as we have already said, appears at first like a minute black point; this gradually rises from the surface of the fungus, until, when the seeds are ripe, it suddenly bursts and distributes its contents over the ground.

The next engraving represents the *Star-like Sphærobolus;* it is not common,



Star-like Sphæroboluſ.

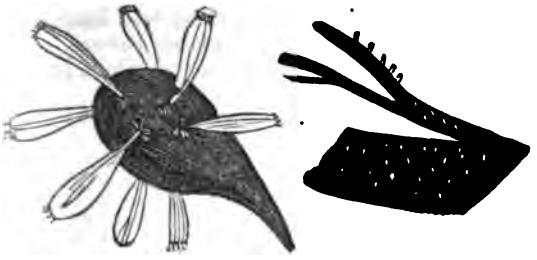
but is found occasionally on rotten wood, &c. The natural appearance of the plant is shown in the upper figure. The figure immediately beneath shows four young specimens, much magnified: at this time they are covered with a kind of white down; from this, however, they gradually emerge as they become mature. The seed-vessel in this species is in the form of a small ball, and is contained within the body of the plant. Figure *a* represents one of these fungi cut in half, so as to show the situation of the seed-vessel. The substance of the plant itself, it will be seen, is formed of several layers, or *laminæ*. As soon as the seed is mature, the upper part of the fungus splits into from five to seven equal portions, leaving the seed-vessel exposed to the air. It is now that a curious provision of nature for the dispersion of the seed comes into action; the inner lining, on which the seed-vessel rests, is suddenly, with a jerk, turned inside out, and the little ball is thrown to a considerable distance (figure *b*), leaving the parent plant empty, and its inner lining inverted, and forming a dome-like top to the fungus (figure *c*). It is wonderful that so great a degree of power should exist in a substance not larger than the head of a pin, since not only is it necessary that the ball of seed should be thrown to some distance, but it has also to overcome a resistance at the opening, which is smaller than the diameter of the ball.



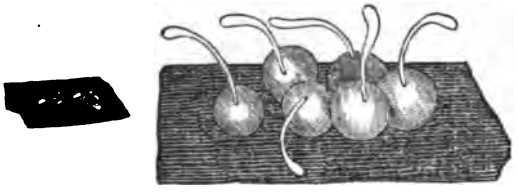
Large Shining Cecithospera.

The large shining Cecithospora is found on the dead leaves of the holly, and is rather common at all times of the year: it appears like so many black spots about the size of a very small pin's head. When magnified, its structure is very curious: the upper figure in the engraving is a section of one of these plants; it contains three seed-vessels, but in some plants the number amounts to five. The seeds, when ripe, are discharged in a stream from one end of these vessels; sometimes, as shown in the lower figure, the seed escapes from both ends of the pods.

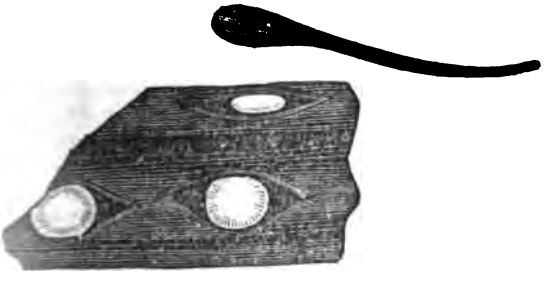
The minute parasitic Stilbum has been found as the parasite upon a parasite,



Minute parasitic Stilbum.



Least Esaria.



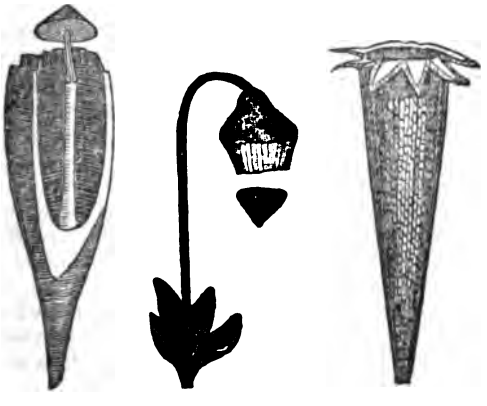
Sycamore petiol Peziza.

obtaining its nourishment from another species of fungus, which, in its turn, obtained its nutriment from the rotten wood on which it was growing. The seeds in this species are dispersed immediately from the rounded head of the plant itself.

The least Esaria is another parasitic fungus, growing upon a plant of its own *order;* it has been gathered in damp places in woods, in the spring.

The Sycamore petiol Peziza was found on the leaf-stalk of the sycamore. In dry weather nothing is perceptible but oblong or elliptical black spots. In moist weather the plant makes its appearance by gradually distending the small slit in the bark of the *petiol*, till it attains its round form, when the margin projects over the edge of the fissure. In the absence of moisture, the whole again contracts and becomes invisible.

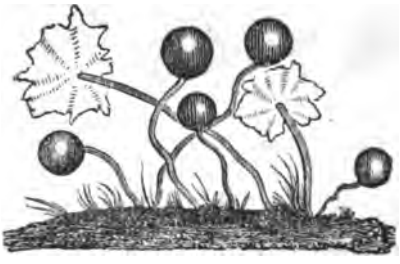
The following engravings are magnified views of the receptacles for the



Seed receptacles in mosses.

seed in several species of mosses; these, in many cases, are very interesting objects for the microscope, and require a glass of very moderate power.

The last engraving is a magnified view of a species of fungus, which formed the mouldiness on an old shoe.



GREAT CHESTNUT TREE OF MOUNT ÆTNA.

[See page 325.]

One of the most celebrated trees in the world is the great Chestnut-tree of Mount Ætna, of which the engraving is a representation, as it existed in 1784; it is known by the name of the *Castagno de' cento cavalli* (the chestnut tree of a hundred horses.) A tradition says, that Jane, queen of Aragon, on her voyage from Spain to Naples, landed in Sicily for the purpose of visiting Mount Ætna; and that being overtaken by a storm, she and her hundred attendants on horseback found shelter within the enormous trunk of this celebrated tree. At any rate, the name which it bears, whether the story be true or not, is expressive of its prodigious size.

We extract the following passage, descriptive of this tree, from the article "Ætna," in the Penny Cyclopædia:—

"It *appears* to consist of five large and two smaller trees, which, from the circumstance of the barks and boughs being all outside, are considered to have been one trunk originally. The largest trunk is thirty-eight feet in circumference, and the whole five, measured just above the ground, are one hundred and sixty-three feet; it still bears rich foliage, and much small fruit, though the heart of the trunk is decayed, and a public road leads through it wide enough for two coaches to drive abreast. In the middle cavity a hut is built for the accommodation of those who collect and preserve the chestnuts.

"This is said, by the natives, to be 'the oldest of trees.' From the state of decay, it is impossible to have recourse to the usual mode of estimating the age of trees by counting the concentric rings of annual growth, and therefore no exact numerical expression can be assigned to this individual. That it may be some thousand years old is by no means improbable. Adanson examined in this manner a Baobab tree (*Adansonia digitata*) in Senegal, and inferred that it had attained the age of five thousand one hundred and fifty years; and De Candolle considers it not improbable that the celebrated Taxodium of Chapultopec, in Mexico (*Cupressus disticha*, Linn.), which is one hundred and seventeen feet in circumference, may be still more aged."

It is evident that if the great chestnut tree were in reality a collection of

trees, as it appears to be, the wonder of its size would at once be at an end. Brydone, who visited it in 1770, says :—

"I own I was by no means struck with its appearance, as it does not seem to be one tree, but a bush of five large trees growing together. We complained to our guides of the imposition; when they unanimously assured us, that by the universal tradition, and even testimony of the country, all these were once united in one stem; that their grandfathers remembered this, when it was looked upon as the glory of the forest, and visited from all quarters; that for many years past it had been reduced to the venerable ruin we beheld. We began to examine it with more attention, and found that there was indeed an appearance as if these five trees had really been united in one, The opening in the middle is at present prodigious; and it does indeed require faith to believe, that so vast a space was once occupied by solid timber. But there is no appearance of bark on the inside of any of the stumps, nor on the sides that are opposite to one another. I have since been told by the Canonico Recupero, an ingenious ecclesiastic of this place, that he was at the expense of carrying up peasants with tools to dig round the Castagno de' cento cavalli, and he assures me, upon his honor, that he found all these stems united below ground in one root."

MISCELLANEOUS.

THE MAIDEN'S ROCK, LAKE PEPIN, ON THE MISSISSIPPI.

[See page 228.]

Lake Pepin is an enlargement of the Mississippi River, of about twenty-one miles in length and generally two and a half in breadth, and situated a few miles below the Falls of St. Anthony. It is encircled by majestic bluffs, with the agreeable exception of an occasional opening of fine meadow land. The surface of the lake presents a smooth and sluggish expanse of water, unchecked by a single island, extending itself, generally unruffled, nearly as far as the eye can reach. In a high wind, however, it is reputed of very dangerous navigation, and on such occasions the voyageurs warn you *le lac est petit, mais il est malin.* About half way up the lake, its eastern bank rises to a height of near four hundred and fifty feet, of which the first one hundred and fifty are formed by a perpendicular bluff, and the lower three hundred constitute a very abrupt and precipitous slope, which extends from the base of the bluff to the edge of the water. The wildness of the scenery, and its contrast with the shores of the river below, render it one of the most interesting spots on this vast flood of water. There is here, also, what we seldom meet with on the lengthened Mississippi, a high projecting point, a precipitous crag resting upon a steep bank, whose savage features singularly contrast with the peaceful lake whose waters lave its base. But the associations connected with this spot invest it with a superior interest, while, at the same time, they throw a gloom over the bright features of the scene. It is remembered as the theatre of one of the most melancholy incidents that often occur in the history of the Indians. We give the tale in the simple language of a guide, who accompanied Major Long in his northern expedition.

"There was, in the village of Keoxa, in the tribe of Wapasha, during the time that his father lived and ruled over them, a young Indian female whose name was Winona, which signifies 'the first-born.' She had conceived an attachment for a young hunter who reciprocated it; they had frequently met, and agreed to a union in which all their hopes centred; but on applying to her family, the hunter was surprised to find himself denied, and his claims superseded by those of a warrior of distinction, who had sued for her. The warrior was a general favorite with the nation; he had acquired a name, by the services which he had rendered to his village when attacked by the Chippewas; yet, notwithstanding all the ardor with which he pressed his suit, and the countenance which he received from her parents and brothers, Winona persisted in preferring the hunter. To the usual commendations of her friends in favor of the warrior she replied, that she had made choice of a man, who, being a professed hunter, would spend his life with her, and secure to her comfort and subsistence, while the warrior would be constantly absent, intent upon martial exploits. Winona's expostulations were, however, of no avail, and her parents having succeeded in driving away her lover, began to use harsh measures in order to compel her to unite with the man of their choice. To all her entreaties, that she should not be forced into a union so repugnant to her feelings, but rather be allowed to live a single life, they turned a deaf ear. Winona had

THE MAIDEN'S ROCK.

at all times enjoyed a greater share in the affections of her family, and she had been indulged more, than is usual with females among Indians. Being a favorite with her brothers, they expressed a wish that her consent to this union should be obtained by persuasive means, rather than that she should be compelled to it against her inclination. With a view to remove some of her objections, they took means to provide for her future maintenance, and presented to the warrior all that in their simple mode of living an Indian might covet. About that time a party was formed to ascend from the village to Lake Pepin, in order to lay in a store of the blue clay which is found upon its banks, and which is used by the Indians as a pigment. Winona and her friends were of the company. It was on the very day that they visited the lake that her brothers offered their presents to the warrior. Encouraged by these, he again addressed her, but with the same ill success. Vexed at what they deemed an unjustifiable obstinacy on her part, her parents remonstrated in strong language, and even used threats to compel her into obedience. 'Well,' said Winona, 'you will drive me to despair; I said I loved him not, I could not live with him; I wished to remain a maiden; but you would not. You say you love me; that you are my father, my brothers, my relations, yet you have driven from me the only man with whom I wished to be united; you have compelled him to withdraw from the village; alone he now ranges through the forest, with no one to assist him, none to spread his blanket, none to build his lodge, none to cook for him; yet was he the man of my choice. Is this your love? But now it appears that this is not enough; you would have me do more; you would have me rejoice in his absence; you wish me to unite with another man, with one whom I do not love, with whom I never can be happy. Since this is your love, let it be so; but soon you will have neither daughter, nor sister, nor relation, to torment with your false professions of affection.' As she uttered these words, she withdrew, and her parents, heedless of her complaints, decreed that that very day Winona should be united to the warrior. While all were engaged in busy preparations for the festival, she wound her way slowly to the top of the hill; when she had reached the summit, she called out with a loud voice to her friends below; she upbraided them for their cruelty to herself and her lover. 'You,' said she,' were not satisfied with opposing my union with the man whom I had chosen, you endeavored by deceitful words to make me faithless to him, but when you found me resolved upon remaining single, you dared to threaten me; you knew me not if you thought that I could be terrified into obedience; you shall soon see how well I can defeat your designs.' She then commenced to sing her dirge; the light wind which blew at the time, wafted the words towards the spot where her friends were; they immediately rushed, some towards the summit of the hill to stop her, others to the foot of the precipice to receive her in their arms, while all, with tears in their eyes, entreated her to desist from her fatal purpose; her father promised that no compulsive measures should be resorted to. But she was resolved, and as she concluded the words of her song, she threw herself from the precipice, and fell, a lifeless corpse, near her disconsolate friends. Thus has this spot acquired a melancholy celebrity; it is still called the Maiden's Rock, and no Indian passes near it without involuntarily running his eye towards the giddy height, to contemplate the place whence the unfortunate girl fell a victim to the cruelty of her relentless parents."

This tragedy was enacted many years ago. But we are told that "there were in the circumstances of this case, several conditions which tended to impart to it a peculiar interest; the maid was one who had been a favorite in her tribe; the warrior whom her parents had selected was one of note; her untimely end was a public one; many were the witnesses to it; it was impressive

in the highest degree; the romantic situation of the spot, which may be thought to have had some influence over the mind of a young and enthusiastic female, must have had a corresponding effect upon those who witnessed it." It did produce an indelible impression upon its witnesses; and the Indian now who has even received the tale from others, relates it with deep and unaffected feeling. It is one of those cases which show how completely the savage is swayed by passion, and presents at the same time a test of its sincerity and constancy.

THE OLD MAN OF THE MOUNTAIN.

[See page 331.]

How numerous and varied the forms assumed by nature; and to be seen by the careful observer, in stones, and shells, and fruits, and flowers, as also in other natural productions. Perhaps her phantasies are more common in the mineral kingdom, and many cases of their occurrence are recorded; for instance, the following: During the French revolution, immediately after the unfortunate Louis was beheaded, a very remarkable portrait of this monarch was discovered distinctly marked in a piece of Labrador spar, and so accurate was the likeness, and so curious was this coincidence reckoned at the time, that a very large sum of money was obtained for it; facsimiles were engraved from it, and worn as rings by his partisans. In the British Museum is an agate, on which is portrayed an accurate likeness of Chaucer. At the present time we have before us a view of a profile, found in the fracture of a nodule of flint, and which, slight as is our acquaintance with the prominent personages in Europe, we immediately pronounced to be the profile of the Duke of Wellington. The figure in the stone, it is said, has somewhat the appearance of an enamel painting, the figure being of a whitish gray substance, surrounded by a dark-gray ground: and when the stone was slit up near its centre, two other profiles were seen, which resembled the face of the present king.

Sometimes nature shows these freaks on a larger scale. Any one who has been upon the North river, must doubtless have been struck with that prominent point in the Highlands, termed *Anthony's Nose*. The *Camel's Hump* too, on the White mountains, is said to bear a striking resemblance to the real object. But perhaps the most singular thing of this character, is the "*Old Man of the Mountain*," figured on the following page. This is found in the Franconia notch, which is a continuation of the range of the White mountains. It presents an exact colossal representation of the human face, as seen in profile, surmounted by a helmet. This face is delineated by the hand of nature, on the brow of a bare rock nearly one thousand feet high. No art could improve the effect, nor could any attempt be made to assist it, for the profile being seen perfect from only one point, the least deviation throws every thing into a confused mass. The upper part of the rock, too, upon which it appears, is perfectly inaccessible.

MOUNT JOLIET, ILLINOIS.

[See page 333.]

Mr. Schoolcraft, in his travels in the central portions of the Mississippi Valley, gives us the following interesting account of his visit to Mount Joliet, in the State of Illinois.

THE OLD MAN OF THE MOUNTAIN.

We now took up our journey across the plains. The day had become sultry, and we suffered much from the combined effects of heat and thirst. We had, on no part of the route, found the proportion of forests so limited. Fields of prairie frequently spread before the eye, like the boundless expanse of the ocean, and the vision is as soon limited. The eye passes over its unvaried surface, often "glancing from earth to heaven," without finding any prominent object to fix upon. Its apparent boundary is the horizon. This monotony of prospect would soon become tiresome, were it not occasionally relieved by small streams of clear water, by limited forests of timber, and by gentle elevations in the surface, which serve to stimulate attention. The slightest changes in the features of the country or in the complexion of the soil, under such circumstances, become interesting;—and the transitions from arenaceous to loamy—from dry to humid soil, and from black carbonaceous mould to loose pebble-stones, as they appear in the deep-cut horse path, are sources of gratification in a country whose prominent asperities are deeply buried beneath alluvial plains. The sudden starting of a prairie hen, or "whirring pheasant" from the heath, or the bounding of a deer on the distant plain, are circumstances which the memory seizes upon, in the common dearth of local interest. So vigorous a growth of grasses and flowering plants covers these plains, that in several places we found them to overtop our shoulders, sitting on horseback;—a proof, if any proof were wanting, of the strength and richness of the soil.

It has been observed, that the first effect of the plenitude of inhabitants is the destruction of wood, but the culture and creation of forests will here demand the earliest attention. It appears very evident, that these grassy plains were once covered with forests of timber. There is no country in the world better adapted to their growth. Whether these ancient forests were burned down by fire, as some have supposed, or destroyed by water, as others maintain, may be an interesting topic for discussion to the geologist:—But the farmer and planter are chiefly concerned in the restoration of the stock and the promotion of its growth.

We entered the strip of woods which form a margin to the Aux Sables, one of the tributary streams of the Illinois, during the most intense heat of the day, and enjoyed its refreshing shade for a few moments. Ten miles beyond this pellucid little river, we halted, and dismounted in the plains, and made a short excursion on foot to *Mount Joliet*.

Any prominent swell in the surface of the soil would appear interesting and remarkable in so flat a country, but this would be considered a very striking object of curiosity in a region of inequalities. It is, strictly speaking, neither a mountain nor a hill, but rather a mound, and the first impression made by its regular and well-preserved outlines, is that of a work of art. This alluvial structure is seated on the plains, about six hundred yards west of the present channel of the river Des Plaines, but immediately upon what appears to have been the former bank of this river. Its figure, as seen at a distance, is that of a cone truncated by a plane parallel to the base, but we find, on approaching, its base describes an ellipsis. Its height we computed to be sixty feet. Its length about four hundred and fifty yards, and its width seventy-five yards. The top is perfectly level. The sides have a gradual and regular slope, but the acclivity is so great, that we found the ascent laborious. There are a few shrubby oak trees on the western side, but every other part, like the plain in which it stands, is covered with grass. The materials of this extraordinary mound are, to all appearance, wholly alluvial, and not to be distinguished from those of the contiguous country, from which, it would appear, they have been scooped out. It is firmly seated on a horizontal stratum of secondary limestone.

MOUNT JOLIET, ILLINOIS.

The view from this eminence is charming and diversified. The forests are sufficiently near to serve as a relief to the prairies. Clumps of oaks are scattered over the country. The lake Joliet, fifteen miles long, and about a quarter of a mile wide, lies in front. There is not perhaps a more noble and picturesque spot for a private mansion in all America. Few persons will choose to pass it without devoting an hour to its examination, and few will perhaps leave it without feeling a conviction that it is the work of human hands. It has been remarked by Dr. Beck, that this is probably the largest mound within the limits of the United States.

DOVER STONE CHURCH.

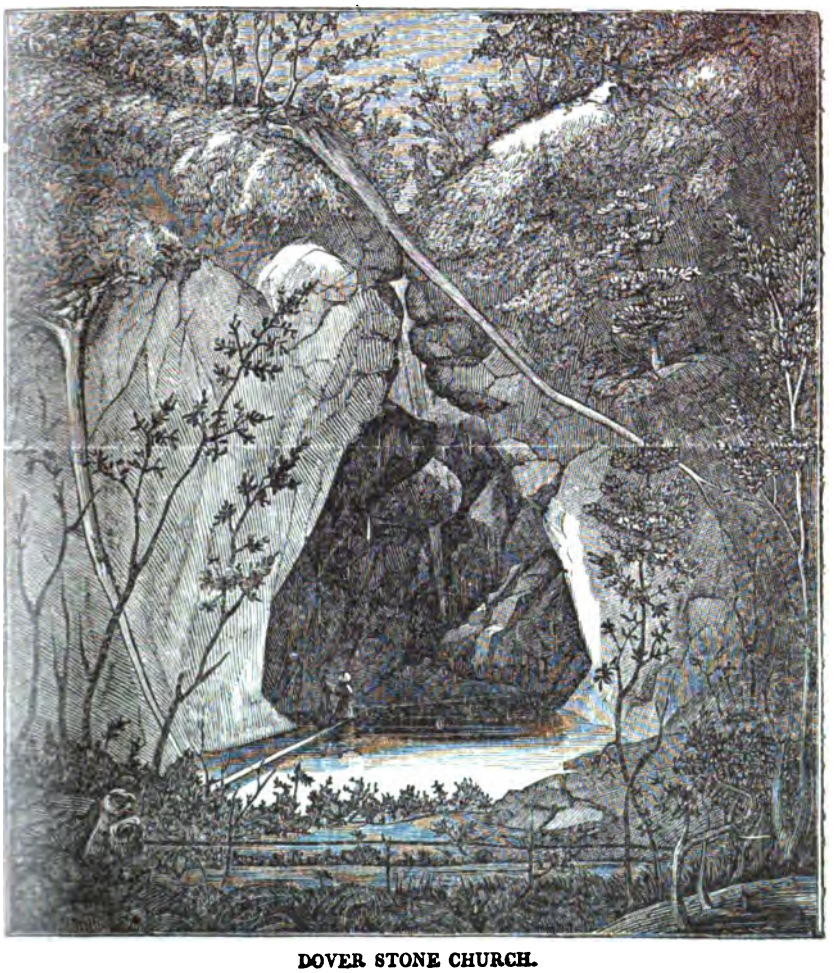
[See page 335.]

The Stone Church at Dover Plains is a singular and interesting curiosity, and its examination is worth a visit to Dutchess county. The following description of it was given some time since by a correspondent of the Evening Post :—

"It was not until a recent sojourn in the county of Dutchess, that I heard of the Dover Stone Church, and from the description I received, soon resolved to make it a visit, though I was then at a distance from it. Nor were my expectations, which had been greatly elevated, disappointed in the least upon arriving there, except that the sublimity of the scene far surpassed the ideas I had formed. My greatest surprise was, that an object so truly worthy the attention of the curious, should have been suffered to remain so long comparatively unknown. This great work of nature is situated in the immediate vicinity of the delightful little village of Dover Plains, about twenty-two miles east of Poughkeepsie, from which place there is an excellent turnpike, leading through a most picturesque section of the country.

The stone church consists of a fissure in the rock, on a declivity of the mountain, and near its base, through which passes a rippling streamlet, which in its passage down, until it reaches the groundwork or floor of the church, forms numerous and extensive cascades, some of thirty feet in height, and from ten to fifteen in breadth. This current has been looked upon as the great architect of the work. The opening, though so narrow at the top as to appear almost closed, gradually widens to its base, so that it forms a vast arch of very considerable regularity, of perhaps twenty feet span and upwards. Its greatest depth is probably two hundred feet, and the inner or principal apartment (it being divided into two spacious halls) is about seventy feet in length, and is well lighted and aired from above. The antechamber, as it may be termed, or hall of entrance, is separated from the Church by a huge mass of rock, which has detached itself from the side or roof, and is aptly styled the pulpit. The view is well fitted to inspire feelings of devotion. The heart, touched by the religious gloom and sublimity of the place, acknowledges the power of the Creator, and rises in admiration of his works.

Upon leaving the church we bent our way for about a mile to the south-east, where, in a hollow of the mountain, are to be seen a number of very beautiful *natural wells*, of various sizes and depths, and of astonishing regularity of form, appearing almost to display the hand of art in describing their periphery. Many of these are accessible, and on our descent we were met by a gentleman with a fishing-rod, who informed us that in some of these he found very excellent sport. As you ascend the mountain, the wells are seen at greater



DOVER STONE CHURCH.

depths, until they attain to several hundred feet below the surface. The verge is well guarded by fallen trees and sapling rails, so that the sight may be enjoyed without the least degree of danger. Between the wells are large cascades, which add greatly to the grandeur of the scene, the foaming torrents of which afford a beautiful and striking contrast with the crystal clearness of the wells beneath. Here, as at the Church, are found upon the fallen trees the records of the visiter, where, having inscribed our own also, we returned to the Stone Church Hotel, situated about a hundred rods from the Church, where we partook of an excellent repast furnished by the enterprising proprietor, Mr. Perry, whose gentlemanly manners, together with the pains he has been at to render a visit to Dover agreeable and interesting, entitle him at least to this passing notice.

I should have mentioned that at the further extremity of the church is a magnificent waterfall, over which you may ascend by means of an artificial stair-case to the height of forty or fifty feet, and that in the sides of the same are extensive ledges into which the spectator may place himself as in a gallery, so that the arrangement of the place naturally suggests the idea of a church, or place of worship.

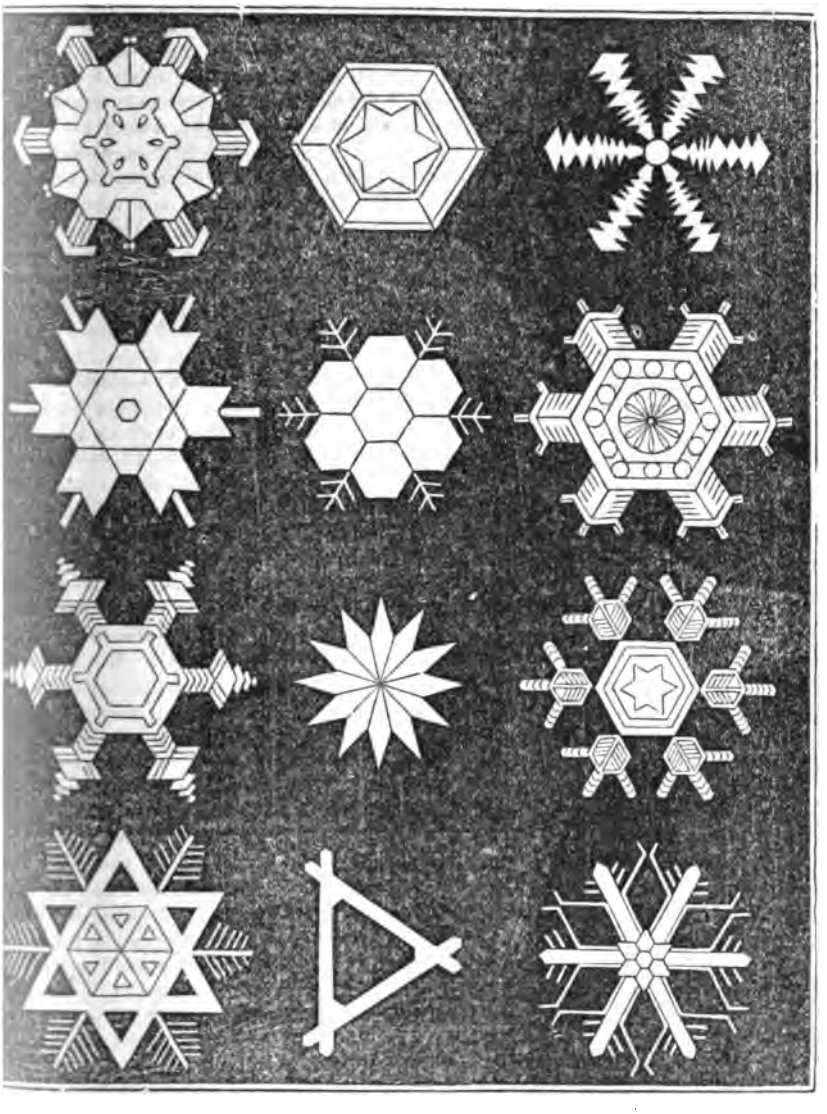
SNOW CRYSTALS.

[See page 337.]

Snow is formed by vapors freezing in the atmosphere. It is not like hail or hoar frost; for on examining a flake of snow by means of a magnifying glass, it appears crystallized, while they are not, and the whole flake appears to be formed of shining spicula diverging from a centre. Dr. Grew, in speaking of snow, observes, that many parts are of a regular figure, like stars with six points, and are as much ice as the water we see frozen. Upon each of these points are others, at the same angles as the main points, among which are irregular broken points and fragments of the regular ones. Some flakes appear to have been thawed and frozen again into irregular clusters, and it would seem that snow is an infinite mass of icicles of regular form, but infinitely diversified. A cloud of vapor being gathered into drops, the drops descend, and in descending pass through a colder region, and each drop is frozen into an icicle, shooting itself forth into several points; then continuing to descend, meet with some currents of warmer air, or in being wafted to and fro, and touching each other, some are thawed and blunted, again frozen into clusters, and entangled together so as to fall down in the form of what we call *flakes*. The *lightness* of snow, although it is really ice, is the consequence of the extent of its surface compared with its bulk; on the same principle that gold may be spread out till it will float upon a mere breath of air.

The *whiteness* of snow is owing to the very small particles into which it is divided; if ice be pounded, it will appear equally white.

An artificial snow may be made by placing a tall vial of aquafortis near the fire till it is warm, and filings of silver, a few at a time, being put into it; after a brisk ebullition, the silver will slowly dissolve. If the vial be then placed in a window where it is cold, as it cools, the silver particles will shoot into crystals, and several running together will form a flake similar to snow, which will then descend to the bottom of the vial; while descending, they will appear like silver snow, and will lie at the bottom of the vial like real snow upon the ground.



ENGRAVED ROCKS.

[See page 339.]

WADY MOKATTEB is a valley entering Wady Sheikh, and bordering on the upper regions of the Sinai mountains. It extends for about three hours' march, and in most places its rocks present abrupt cliffs, twenty or thirty feet high. From these cliffs large masses have separated and lie at the bottom in the valley.

The cliffs and rocks are thickly covered with inscriptions, which are continued, at intervals of a few hundred paces only, for at least the distance of two hours and a half. Burckhardt says, that to copy all of them would occupy a skilful draughtsman six or eight days. The inscriptions are very rudely executed, sometimes with large letters, at others with small, and seldom with straight lines. The characters appear to be written from right to left; and although not cut deep, an instrument of metal must have been required, as the rock is of considerable hardness. Some of them are on rocks at a height of twelve or fifteen feet, and must have required a ladder to ascend to them. The characters are not known. The superior of the Franciscans, who visited the place in 1722, observes: "Although we had among us men who understood the Arabian, Greek, Hebrew, Syriac, Coptic, Latin, Armenian, Turkish, English, Illyrian, German, and Bohemian languages, there was not one of us who had the slightest knowledge of the characters engraved in these hard rocks with great labor, in a country where there is nothing to be had either to eat or drink. Hence it is probable that these characters contained some profound secrets, which, long before the birth of Jesus Christ, were sculptured in these rocks by the Chaldeans or some other persons." This account excited profound attention in Europe: and it was thought by many that the inscriptions might have been framed by the Israelites during their stay in this region, and probably contained irrefragable evidence for the truth of the Mosaic history. Hence copies of them have been anxiously sought and secured. But with the exception of a few in Greek, the character and language remain unknown. "Before they can be all deciphered," says Laborde, "greater progress than has yet been attained must be made in the paleography and ancient languages of the East. The most general opinion is, that they were the work of pilgrims who visited Sinai about the sixth century." This seems to us very doubtful. The Greek inscriptions and the crosses on which this conclusion chiefly rests, may indeed have been of that or a later age; but it does not follow that those in the unknown characters necessarily were so too. However, this is of no consequence for our purpose, which is merely to illustrate by example the practice of charging the living rock with inscriptions; and that example is the more interesting from being taken from a region of so much Scriptural interest, and not far from the land of Uz. Although these inscriptions should prove not to be of high antiquity, and only to record the names and prayers of Jewish and Christian pilgrims to Sinai; the rude manner in which they are exhibited may well be supposed to be such as belonged to the time when men first began to inscribe on rocks their abiding memorials. It only remains to add, that among the inscriptions appear sometimes extremely rude figures of men and animals (camels, goats, &c.), some of which seem to be of the same date as the original characters, while others seem to belong to a more recent period.

ENGRAVED ROCK IN THE OUADI MORATTAH.

DIGHTON ROCK IN MASSACHUSETTS.

THE cut above represents an inscription found upon a rock at Dighton, Massachusetts, which has given rise to much speculation, and to many theories, all of which, however, are more or less objectionable. The following remarks in regard to it, are from the Philadelphia Saturday Courier.

The "Dighton Rock," in Massachusetts, lies upon the east side of Taunton river, between high and low water marks, so that it is covered and exposed at every ebb and flow of the tide. The fac-simile was taken by Mr. Job Gardner, a self-taught artist, well known to the public as a manufacturer of globes, formerly of this town, but for the last years of his life a resident of Dighton: his method in taking it was to cover the face of the rock with paper, and draw lines over the vacancies: then, with a graduated machine, constructed by himself, he drew and cut it (much reduced in size) upon stone, from which this impression was taken.

The writer of this has visited this rock, and believes the correctness of the fac-simile may be depended upon.

The inscription presents four parts or divisions, and has no appearance of being a mere record of names and epitaphs, but is evidently intended to record some important event, probably a combat.

The first part, commencing on the left, is an Indian armed with bow and arrow, and may represent a body of armed Indians.

The second appears to be all hieroglyphic, and probably its definition involves the greater part of the secret, though it doubtless refers more particularly to the first part.

The third division is evidently a vessel with bows, stern, quarter-deck, rudder, and cable and anchor; the triangle on the starboard quarter, I believe, denotes, in hieroglyphic language, fighting, or a place to fight from, a fort or battery; there are several double and single triangles in the second part.

In the fourth we see two human figures, evidently differing from that in the first, without bows and arrows; they appear to represent the party connected with the vessel.

The first question that arises is, who were the authors—Asiatics, Indians, or Phœnicians? The skill displayed in drawing the Indian on the left, and

CANE BRAKES.

the great falling off when attempting to portray a stranger, with the landsman-like shape of the vessel, is a reason of some weight for ascribing the merit of the work to the Indians.

With no knowledge of hieroglyphics, I have merely offered a few ideas respecting the inscription, such as would naturally arise in any one upon viewing it.

CANE BRAKES.

[See page 341.]

In nearly all the southern States and Territories, and particularly in Louisiana and Texas, tracts of low and often marshy land are frequently met with, overgrown with the long and slender reeds which are used among us at the North as fishing rods. These tracts are called cane brakes. They sometimes grow in woods and forests as underbush, and are as often found not intermingled with trees, but form a thick growth by themselves, almost impenetrable when the cane is dry and hard. The frequent passage of men and horses through some of them, keeps open a narrow path, not more than wide enough for two horses to go abreast conveniently, as represented above. These paths are often completely covered overhead by the reeds, which droop inward on account of the slenderness of their support, and intermingle their tops directly over the path. The reeds grow about twenty feet high and upwards; and along some of these arched avenues the traveller proceeds, shut out from the view of the sky. Cane brakes not uncommonly occur of a league, and indeed of several leagues extent. In Texas, it is stated, there is one seventy miles in length, with scarcely a tree to be seen in the whole distance. The reeds serve as food for cattle and horses in winter, and are an invaluable and never failing resource when the prairies yield no grass. They are an annual plant, and are young and tender in the winter. When dry they are frequently burnt, to clear the land. Cane brakes are a great annoyance to hunters, affording a secure shelter to wolves and bears, and other objects of pursuit, while to them they are impenetrable.

VIEW OF THE PETER BOTTE MOUNTAIN.

[See page 343.]

The island called Mauritius and the Isle of Bourbon lie near to each other, off the east coast of Africa, having, however, the great island of Madagascar between them and that continent. They were first discovered in the sixteenth century by Pedro Mascarenhas, a Portuguese, from whom the group to which they belong is sometimes called the Mascarenhas. The discoverer himself gave to the Mauritius the name of Ilha do Cerno. The Portuguese, however, never formed a settlement here; and in 1598 the island was taken possession of by the Dutch admiral Van Nek, who called it by the name by which it is now commonly known, after Maurice, Prince of Orange. The Dutch, finding it of little use, although they had begun to colonize it in 1640, abandoned it altogether in 1712; and in 1712 the French, who had been already for some time in possession of the neighboring Isle of Bourbon, began to colonize it. From them it received the name of the Isle of France, and they retained it till December, 1810, when it was taken from them by the English. It still remains a British colony.

VIEW OF THE PETER BOTTE MOUNTAIN.

The Mauritius is extremely mountainous, and exhibts in every part of it the marks of volcanic action. Some of the mountains are between two and three thousand feet in height, and are covered with snow during a great part of the year. Among them are several that assume the most singular and fantastic shapes; but the most extraordinary in its appearance is that which bears the name of Peter Botte, from a person who is said by tradition to have climbed to its summit many years ago, and to have lost his life in coming down again. This, however, is a mere unauthenticated rumor; and even if the attempt was actually made by the person in question, it is evident that the fate which overtook him must have rendered it impossible to say whether he succeeded in his enterprise or not. In point of fact, the top of the mountain has been usually regarded as quite inaccessible, notwithstanding the boast of a Frenchman about forty years ago that he had succeeded in reaching it.

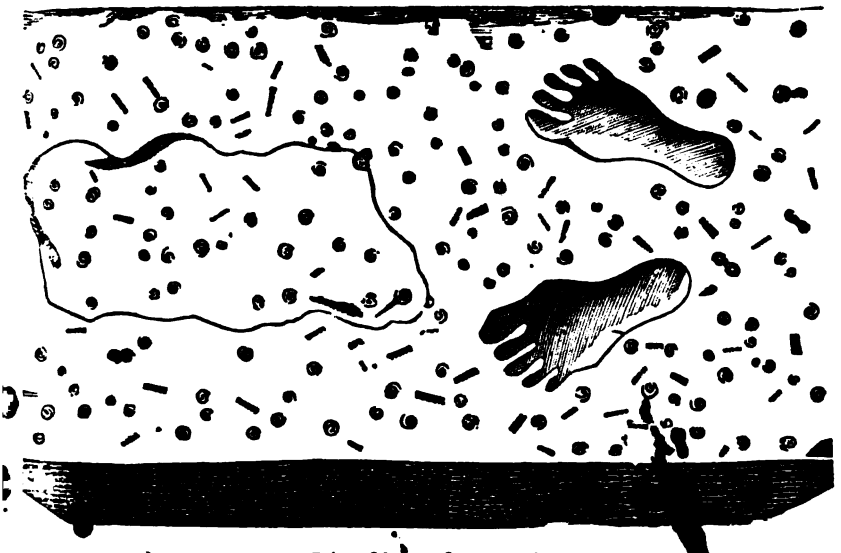
PRINT OF HUMAN FEET IN ROCKS.

In "Schoolcraft's Travels in the central portions of the Mississippi valley," page 173, we find the following interesting description of two apparent prints or impressions of the human foot in a tabular mass of limestone, at New Harmony, Indiana. The stone had been previously conveyed from the banks of the Mississippi, at St. Louis, and carefully preserved in an open area.

"Being aware of the conclusions which must result to geology from a fact of this nature, and that all former notices of the organic impressions of our species in well consolidated strata have been deemed apocryphal, we were induced to examine the subject with particular attention. To obtain an exact drawing of these interesting prints, we moistened a sheet of paper to a degree that permitted its being pressed by the palm of the hand into the most minute indentations. While thus pressed in, we drew the outlines in pencil. From this drawing, the accompanying plate is a faithful transcript, on a reduced scale. We present it to the public as being more minutely accurate than our own figure of the subject, published in the American Journal of Science.

"The impressions are, to all appearance, those of a man standing in an erect posture, with the left foot a little advanced and the heels drawn in. The distance between the heels, by accurate measurement, is six and a quarter inches, and between the extremities of the toes, thirteen and a half. But by a close inspection it will be perceived, that these are not the impressions of feet accustomed to the European shoe; the toes being much spread, and the foot flattened, in the manner that is observed in persons unaccustomed to the use of the close shoe. The probability, therefore, of their having been imparted by some individual of a race of men who were unacquainted with the art of tanning skins, and at a period much anterior to that to which any tradition of the present race of Indians reaches, derives additional weight from this peculiar shape of the feet.

"In other respects, the impressions are strikingly natural, exhibiting the muscular marks of the foot with great precision and faithfulness to nature. This circumstance weakens, very much, the supposition that they may *possibly* be specimens of antique sculpture, executed by any former race of men inhabiting this continent. Neither history nor tradition has preserved the slightest traces of such a people. For it must be recollected that, as yet, we have no evidence that the people who erected our stupendous western tumuli possessed any knowledge of masonry, far less of sculpture, or that they had even invented



Print of human feet in Rocks.

a chisel, a knife, or an axe, other than those of porphyry, horn-stone, or obsidian.

"The average length of the human foot in the male subject may perhaps be assumed at ten inches. The length of each foot in our subject is ten and a quarter inches: the breadth, taken across the toes, at right angles with the former line, four inches; but the greatest spread of the toes is four and a half inches, which diminishes to two and a half at the heel. Directly before the prints, and approaching within a few inches of the left foot, is a well-impressed and deep mark, having some resemblance to a scroll, whose greatest length is two feet seven inches, and greatest breadth twelve and a half inches.

"The rock containing these interesting impressions is a compact limestone of a grayish blue color. It was originally quarried on the left bank of the Mississippi at St. Louis, and is a part of the extensive range of calcareous rocks upon which that town is built. Foundations of private dwellings, and the military works erected by the French and Spaniards, from this material, sixty years ago, are still as solid and unbroken as when first laid."

THE SIAMESE TWINS.

[See page 346.]

Eng and Chang (the names of the twins, Eng being on the right and Chang on the left) were born in 1811, in a small village on the coast of Siam. Their mother bore seventeen children: once she had three at a birth, and never less than two; but none of those of her children were deformed. Their parents obtained their living by fishing, and, until 1829, when they were brought to the United States, Eng and Chang employed themselves by selling shell-fish, &c. Since 1829, they have visited different parts of the United States, and have crossed the Atlantic, to England and France, where they have been visited and examined by the scientific.

The Siamese Twins.

They are united at the anterior part of the chest, by a prolongation of a kind of fleshy band, the size of the hand. The ensiform cartilages of the breast-bones are bent outward, and united by ligaments at their extremities, forming a kind of joint which admits of motion in various directions. By the pulling of these ligaments, occasioned by almost every movement, the integuments below have been drawn out, as it were, so that the whole forms a band of union, horizontally about two inches broad, and in thickness, vertically, about four inches. Its length was, doubtless, originally very small. The whole mass is tough, and capable of being extended very considerably. When loose, that is, when the boys face each other and stand close together, if one hand be placed above this curvature, and the other below it, and the latter be then pressed forcibly up, the hands approach each other so nearly, as to convey the impression (doubtless a correct one) that the intervening substance is little more than the ensiform cartilages united by ligaments, and surrounded by the integuments. The concave inner, but in this case *under* surface of these cartilages, is distinctly felt, but no pulsation whatever is distinguishable.

Although we cannot say that the skin which envelopes this projection was originally endowed with less sensibility than that which covers other parts of the body, yet it is evident that such deficiency exists at present. We were urged to press it forcibly between the fingers before any mark of pain was excited, and we were informed by the attendant that he had often pinched it during their slumbers without disturbing them.

The precise effect of this physical union on the intellectual faculties, the moral sentiments, and animal propensities of these boys—its influence on the functions of the different organs, and how far it would communicate or modify the effects of morbid or medicinal agents, are subjects on which we shall not enter. No opportunity has yet presented of observing the influence which disease or medicine in one, would exert on the other; but circumstances do not appear to justify the least suspicion of any mental individuality. Whispering in the ear of one, conveyed no sense of sound to the other. Volatile salts applied to the nostrils of one, produced in the other only a curiosity to try the same experiment on himself. Pinching the arm of one, was attended by no sensation in the other. Being desirous of ascertaining if there was *any* point where both felt, we made an impression with the point of a pin in the exact vertical centre of their connecting link; both said it hurt them. We then made other impressions, extending them very gradually further from this point; the result was, that within the distance of three-fourths of an inch from the centre toward each boy, sensation was communicated to both by a single prick; beyond this it was excited in one only, the other perceiving it in no degree whatever. This experiment was remarkably satisfactory, and we apprehend that farther than here exhibited, the two youths must be considered, whilst in a state of health, as free and independent agents, and the functions of all the other organs as unconnected as those of their brains.

Twins generally resemble each other in intellect and disposition, as well as in person, and this is particularly the case with the boys in question. When to this natural resemblance we add the habit they have contracted of acting simultaneously and in concert, we shall be less surprised than we might at first be, at the facility with which their various movements are performed, and the quickness with which one responds to the inclinations of the other.

In the course of their voyage, they would not only run, we are told, and leap with great agility, and without interfering with each other, but climb to the masthead as fast as any sailor on board the ship. They are seldom observed to converse with each other, and the concert with which they act seems to be al-

most instinctive. In playing the game of draughts, for example, which they learned with great ease, being of a people naturally fond of games and gambling, they were observed to decide on their moves almost instantaneously, and to make them with a quickness and air of decision sufficiently characteristic of all their movements. In the course of the game, sometimes one, and sometimes the other would make the move; they appeared to have the same plans, and always acquiesced in the moves of each other. Yet they sometimes *play against each other;* but so strong is their habit of co-acting, that such games go on with less freedom than when opposing a third person. Their alvine evacuations generally occur at the same time; their appetites and tastes are all very much alike; and they appear not only contented, but happy, and extremely attached to each other.

CASTLE ROCK.

Castle Rock.

A SKETCH and description of this curious rock, were found in the Philadelphia Saturday Courier.

It is situated, we are inform[illegible] on the Big Prairie, about ninety mil[illegible] southwest of lake Pepin, Upper Mississippi. It stands upon a small rise of ground; at the first sight it appears like a castle or a church without a cupola, and can be seen twenty or thirty miles.

The base-rock is about one hundred feet in circumference, and in height about sixty; the rock on the top varies in circumference, from three to fifteen, or perhaps twenty feet; the height of this rock is, at least, thirty feet, and it appears as if the least puff of wind would blow it over,—it stands on so small a foundation, a mere pivot, and on so elevated an eminence. The rock is called by the Sioux Indians, the Standing Stone, or Castle Rock;—they have tried frequently to get on the top, but have never succeeded.

WONDERS OF ART AND MIND,

ANCIENT AND MODERN;

CONSISTING OF

VIEWS OF CITIES, PUBLIC BUILDINGS, MONUMENTS, TEMPLES, STATUES, BRIDGES, &c.

CITIES, PUBLIC BUILDINGS, &c.

THE ESCURIAL OF SPAIN.

SPAIN, sunny Spain, the land of all that is stirring and romantic in chivalry, and all that is passionate and beautiful and lovely in nature. Byron in his Childe Harold has thrown over her the magic spell of enlivening romance, in describing the heroic achievements of the maid of Saragossa. But contemplate Spain in any point of view, and an interest of the most powerful kind gathers over her history—whether we look at her records and annals, her prostrations under the Visigothic and Moorish powers, her rise under the lines of Aragon and Castile, and the magnificent empire which she assumed under Charles V. In natural beauty no land surpasses her:

> "It is a goodly sight to see
> What heaven hath done for this delicious land;
> What fruits of fragrance blush on every tree,
> What goodly prospects o'er the hills expand."

Her literature has excited much attention, and the Araucana of Ercilla, and the dramas of Lope de Vega and Calderon, and the histories of Mariana, Herrera, and Solis, with the inimitable satire of Cervantes, have raised her very high, though certainly not on a level with some other nations of Europe. But Spain is more remarkable for her two great buildings, the Escurial and the Inquisition: the latter has indeed perished, but it will ever hold a memory in the heart of man; and in the remarkable records of modern Europe the former still exists, and to it we must pay some portion of our attention.

Philip the Second of Spain was the son and successor of the Emperor Charles the Fifth. To this son the emperor resigned the imperial crown when he retired from the avocations of public life to end his days in a convent. Philip does not commend himself either to our love or veneration by any traits of his character; he was haughty, reserved, and secrete, and upon his accession to the throne, instead of conciliating his enemies, he made his friends his foes; he allowed the electors and most illustrious princes of Germany to remain in his

Philip the Second.

presence uncovered, and assumed a haughty and distant demeanor, which the great Charles, his father, never affected in the proudest days of his power and victory. He is connected with the history of England, as the husband of Mary, the lover of Elizabeth, and the instigator of the expedition of the Spanish Armada. Our readers have now before them the character in brief of the founder of the Escurial.

The Escurial owes its name to very humble origin. Ferruginous ores abound in the neighboring mountains. Escoria, from the Latin scoria, is the term in the Spanish language for metallic dross, and escorial is the topographic derivation, signifying a place of irruption for this dross. A corruption from the etymology has occasioned the exchange of the second vowel, whence the name Escurial. The building owes its origin to the battle of St. Quintin, gained by the Spanish over the French arms on the 10th of August, 1557, the festival of the martyrdom of St. Lorenzo, or St. Lawrence. Philip, whose austerity was strongly tinctured with superstition, and whose gloomy brow was far more fitted for a cowl or a cloister than a crown or a palace, made a vow, upon the achievement of this victory, that he would build a church, a monastery, and a palace; this he did, and consecrated them as one building to St. Lawrence. Nor did the superstition stop here; the building must be in the form of a gridiron, the legends of the fathers telling us that it was upon this instrument the saint was tortured. Philip continued the building during a period of twenty-two years, reserving large sums for the purpose of thus gratifying his vanity and devotion, and thus the monarchs of Spain are indebted to him for a palace, not the most elegant, but the most royal, magnificent, and sumptuous of any in Europe.

But where, and how, is this building situated,—this extraordinary building,

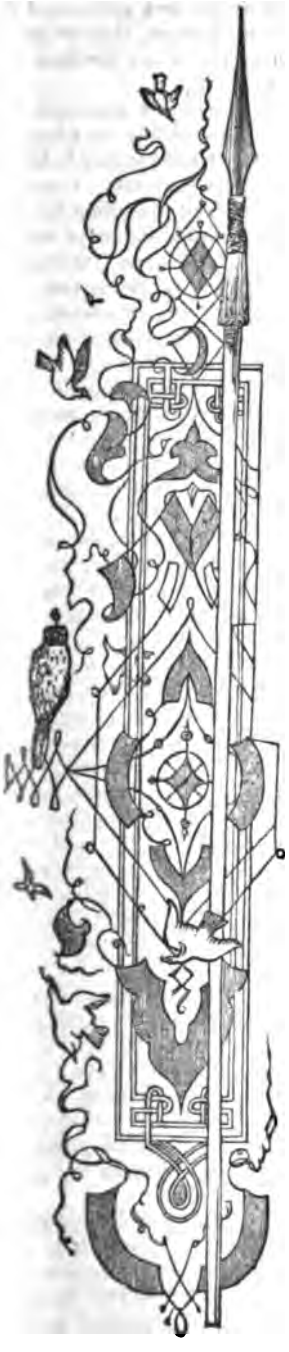
which has excited so much astonishment? Most monarchs lay the foundations of their palaces in the midst of parks, and then grateful breezes float round their mansion, and give an air of balmy serenity to the place. Others lay the foundations of their palaces in the midst of the mighty metropolis, where life and fashion and beauty and intellect glow in a bright galaxy. But neither in the park nor the metropolis stands the palace of the Escurial: it stands in a wilderness; it is situated seven leagues from Madrid; and if the traveller would reach it he must pass over three leagues of a vast and desolate plain. On his left he will see the gloomy forests of El Pardo and La Zarzuella; the building itself is overhung by dreary mountains, forming part of the chain of the Pyrenees, and the ground all around it is alternately rocky and marshy; on the plain, the stork, with its snow-white plumage, may be seen marching in conscious security, and the howl of the wolf and the boar may be heard in the forest. Such is the situation of the Escurial. But, nevertheless, if there be darkness without, there is light and glory and magnificence within; pass where we may, we are surrounded by the splendors of pomp and religion, and anon by the pleasingly melancholy shadow of monastic gloom. The glory of the place grows upon us as we pass along. In the square of the kings we are not struck by any particular and overpowering feelings, although here we are gazing upon statues of the six Scripture kings of twice the size of humanity.

But beneath these statues is the temple. Let us enter; how sacred the feeling which thrills every vein! mark the beauty of its three aisles; mark the grandeur of its vaulted roof, with its octagonal divisions, and the paintings of Lucas Jordan shedding life through each. But what an altar! the eye is dazzled in the mere endeavor to scan the glory: its steps of red veined jasper marble, and the altar-piece eighteen columns of red

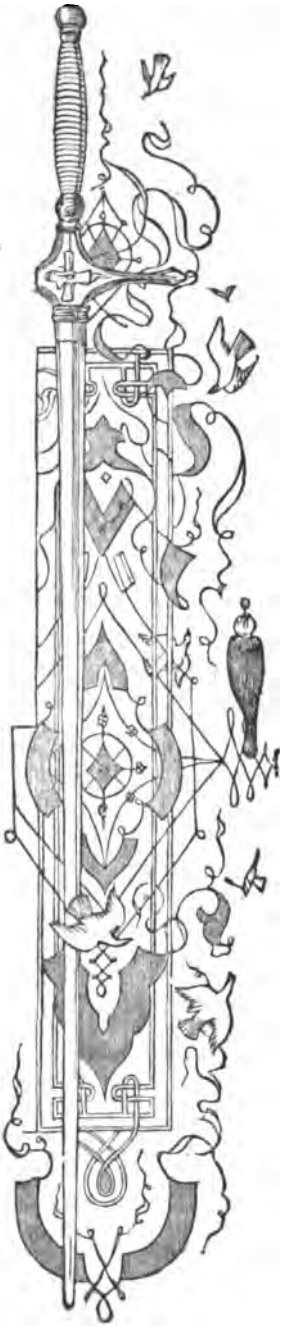
or green jasper, alternated with bronze statues, gilt in fire, each column with its gilt capital and base, and blending the four most beautiful orders of architecture, Doric, Ionic, Corinthian, Composite. But all connected with the temple is not yet before us. Look into those chapels on either side the altar,—those in that on the gospel side: what arrests your attention? the kneeling figure of the Emperor Charles V.; he is in the act of worship; the statues behind him are the figures of his Empress Isabel, his daughter Maria, and his sisters Elenora and Marie. If those who planned and executed these sculptured figures had represented Charles sitting on his throne, with the sceptre of royalty in his hand extended over a world, they would have been acting more in consistency with the boastful language sculptured on the walls of the chapel, "Hunc locum si quis posterorum Caroli V. habitam, gloriam rerum, gestarum, splendore superaveris ipse solus occupato cæteri reverenter abstineti." The chapel on the epistle side is graced with similar statues; of Philip II., four of his wives, and one of his sons. Passing from the temple, we are next introduced to the Pantheon, which is immediately under the great altar. Here again we are greeted with the recognition of the importance attaching to the dust of monarchs; a black slab of marble over the doorway tells us

"Hic locus sacer mortalitatis exuvius catholicorum regum."

A figure stands on either side, of marble; one is Human Nature, and by a crown falling from its head, and a sceptre from its hand, its perishing character is imaged forth: beneath is the inscription, "Natura occidit." The other figure is Hope, signified by the inscription, "Exaltat spes," and a torch of bronze. Those who have entered the royal vaults of England, and imagine them splendid, can have no idea of the towering elegance of the royal tombs of the Escurial; they resemble rather a chamber decked for a bridal than a corpse room, where death holds his proudest sceptre; no stern solemnity here meets the eye; none of the funeral shadows which fall on the most entrancing of *our* mausoleums; these are regal sarcophagi, and we might suppose that Death himself lies buried here, that the men here entombed were his conquerors, and that these marks of *their* dissolution were the emblems of their victory, which they had planted over *his* grave. Generally when we enter a vault, we are ushered in by the sombre gleamings of torchlight, but the marble stairs leading to these proud tombs are illuminated with the brilliant beamings of bronze gilt candelabras; the pantheon itself is formed of jasper and marble of the finest polish, and everywhere the eye is met by the brightest specimens of Composite architecture. Around the pantheon are twenty-six niches, in which are deposited as many sepulchral urns of black marble, with bronze gilt mouldings, supported on lions' paws of bronze, and in the front of each a brass-gilt plate, on which are inscribed the names of the monarchs and their queens, whose dust they contain. In this pantheon only crowned kings are interred, and such queens as continued the succession; the other queens, princes, and princesses, are buried in a vault less splendid and more crowded. When all this useless pomp and gaudy show rush on our vision, one cannot but ask ourselves whether, when the trumpet's swell shall ring amidst these urns, and bid the very marble spring to life, the dust they hold shall rise more joyfully? one cannot help asking whether, even now, they sleep more sweetly and soundly, reposing as they do amidst their brethren of the throne, with all the unimaginable splendor which burnished gold, and polished marble, and streamy lamps could pour upon their tombs. It is worthy of remark, that these pantheons, although designed, were not executed by Philip II. The original vault which he constructed was one of common



stone, without light or ornament, with a dark narrow winding staircase; this defect he acknowledged, when he said that he "had raised a habitation for God, and that his son might, if he wished, make one for his bones and those of his fathers." And the speech of the morose Philip was certainly more commendable than the paltry earth-born vanity which suggested the erection of these tombs; for clothe death with all the imagery and splendor and magic power which the most inventive fancy can fling around him, and is he not death still, —an unseen thing of terror, from which we shrink back dismayed! and clothe death with all the horror, and all the dread, and all the darkness which the veriest hypochondriacism can picture to the mind; let the bell toll its muffled notes, and let sculls, and bones, and worms, and clammy earth, and waving grass, be present to the mind, why death is not a whit the less the bright angel whose dart is the ægis of Life. If tombs, and trophies, and inscriptions, then, must be, why the noblest that a man could plant upon his grave



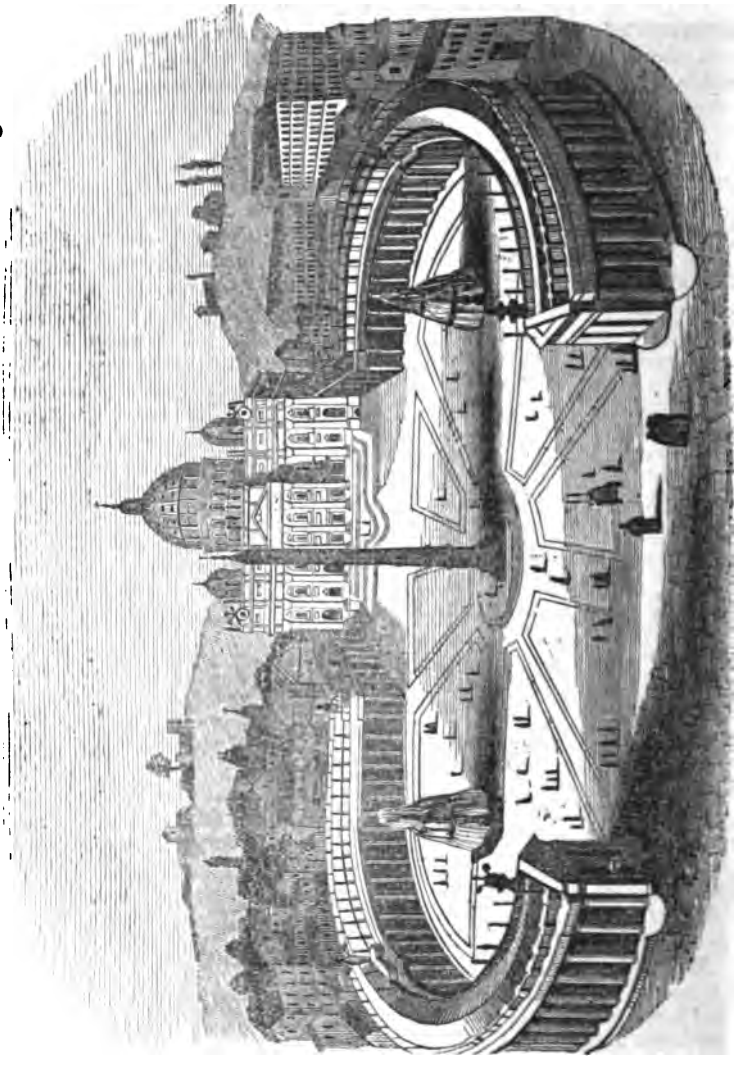
would be the phœnix soaring through the heavens from his own pyre; and thus he would assert a prouder triumph over the King of Terrors, than if all the sculptured obelisks of Egypt and all the elegant urnaries of the Escurial indicated his burial-place.

The next place of importance is the Library, and it certainly must call forth a warmer degree of applause than the sepulchre. The ceiling is admirably painted in fresco with subjects analogous to the place. Here Oratory holds her seat, surrounded by Isocrates, Demosthenes, Cicero, Quintilian. Cicero is represented as moving the judges of Raserius to tears while pleading for him, and the painting at once represents the fire of eloquence and the fire of melting compassion. There Grammar holds a cloudy throne; and there Philosophy, descending in the schools of Athens, teaches to Aristotle, Socrates, and Plato the laws which govern the world. There is another and smaller library above this, appropriated to manuscripts in Hebrew, Greek, Arabic, Latin, and other languages. Both the libraries contain some works of an exceedingly curious character: the manuscripts amount to 4000, the printed books to 24,000. It is to be regretted that these treasuries of knowledge are inaccessible to many, who, through their influence, might pour a blaze of glory and brilliancy upon our literary hemisphere, unparalleled through every stage of its history. The aspiring and the curious mind travels far over the southern desert to snatch from destruction some fragment of antiquity, to decipher some labored hieroglyphic, to give a tongue to the pyramid, an eloquence to the sarcophagus, and a tone to the temple of Thebais, and they are ours with all their mysteries; no hand prevents our inquisitive glance amidst their ruins, and no law forbids our analysis of their signification. Oh! if the learning shrined in the monastic institutions of Spain, and especially her Escurial, were suffered to trend beyond its boundary, what an era would it be! Philosophy would investigate the secrets of Saracenic erudition, while poetry kindled a new glory on her torch, from the sublime sentiments of Garcia and the inventive talent of Lopez. The Sacristy is considered the most truly valuable of any part of the building, estimating it by the treasures it contains in paintings. Amongst them are several of the works of Leonardo Da Vinci, Carlo Veronese, Titian, Raphael, Guido, and the Spanish Raphael, Murillo. The master-piece of Raphael is deposited here; it is called La Perla, or The Pearls. It is five feet high, by three and three quarters wide: the Virgin has her right hand around the child, who is sitting in her lap, and rests one leg on the right knee of his mother, the other being extended; the foot gently presses the little blankets in a cradle, out of which he appears to have been just taken, glowing with life and infantile loveliness. The left hand of the Virgin rests on the shoulder of St. Anne, who is upon her knees near her. The infant St. John is offering some fruits in his garment of camel's skin, and the child makes a motion to take them, at the same time turning his laughing face to his mother, who is looking on St. John. On one side of the picture is seen an opening of light in the horizon, in front of which are a river, a town, and various little figures; on the other side there are ruins of an edifice, in the shade of which St. Joseph stands contemplating this beautiful scene. It is painted on panel, and, for its better preservation, covered with a green silk curtain, which is drawn aside by the father when he wishes to show the greatest ornament of his convent.

In the southern front of this sacristy is preserved with great devotion, and amidst sumptuous ornaments, a consecrated host, the history of which is said to be as follows:—At some period not well ascertained, in the sixteenth century, a party of Zuinglian dissenters entered the cathedral church of Goreum, in Holland, threw this host on the ground, and repeatedly trampled upon it

until it was rent in three places. Whilst they were yet trampling upon it, one of the Zuinglians perceived that blood came forth from the three rents, which may still be seen; he was struck with such a strange appearance, and went out to communicate it to the dean. Both proceeded to the church, and taking up the host with fearful respect, they carried it to Malines, where they deposited it in a convent of Franciscan friars; there it remained for a length of time, greatly venerated. From them it was transferred to Vienna, and afterwards to Prague, where it remained for eleven years, until Philip II. obtained it from Rodolphus II., emperor of Germany. It was deposited amongst the relics in the temple, until Charles II. erected a peculiar altar for it in the sacristy, whither it was removed in 1664. Upon the invasion of the French, the monks, fearful that the enemy would profane it, concealed it in one of the cellars of the monastery, where it remained until the liberation of the country, when it was restored to the altar, where it is still preserved. Although such a length of time has elapsed since its original preparation, it is yet as free from corruption as if it were just consecrated. Such is the history given by the monks, and they all believe it to be quite true. But Mr. Beckford saw a wonder which far eclipsed the miraculous host. We think our readers will like his mode of telling the story best, and shall therefore quote him. "The prior, who is not easily pleased, seemed to have suspicions that the seriousness of my demeanor was not altogether orthodox. I heard him say to Roxas (Mr. Beckford's companion), 'Shall I show him the angel's feather; you know we don't display this, our most refined, incomparable relic to everybody, nor unless upon special occasions?' 'The occasion is sufficiently special,' answered my partial friend; 'the letters I brought to you are your warrant, and I beseech your reverence to let me look at this gift of heaven, which I am extremely anxious to adore and venerate.' Forth stalked the prior, and drawing out from a remarkably large cabinet an equally capacious sliding shelf (from whence proceeded a strong potent odor), displayed lying stretched out upon a quilted silken mattress, the most glorious specimen of plumage ever beheld in terrestrial regions; it was a feather from the wing of Archangel Gabriel,—full three feet long, and of a blushing hue, more soft and delicate than that of the loveliest rose. We all knelt in silence, and when we rose up after the holy feather had been again deposited in its perfumed lurking-place, I fancied the prior looked doubly suspicious, and uttered a sort of *humph* very doggedly, nor did his ill-humor evaporate upon my desiring to be conducted to the library."

Such is the Escurial,—the description is, as it necessarily must be, very weak; yet we think it is, when the paucity of space is taken into consideration, as comprehensive and extended a sketch as could be well expected. The feelings which arise in the mind after travelling in thought over such a building, and considering the varied information and examining the varied opinions upon it, are various. Here we have royal magnificence and monastic gloom; here we have mighty intellect and grovelling superstition. Why was the Escurial built? Was he a wise man who built it? It is a question which the place itself may answer. The man who built the Escurial was not a wise man, or he would not have built a palace in the midst of a desert, and a majestic church, where no voice save the voice of the monk was to lift up its chant to the Father of All. The builder of St. Peter's of Rome might have been a wise man, at least in this particular, that he did not build his temple for a wilderness to admire. The founder of the Escurial might have been an ascetic, but not a wise man. Yet mighty lessons may man learn from that magnificent pile. It is a world in miniature. There are the chambers where the loud laugh is heard, and there is the grave where all is still; there is the light of knowledge beam-



FRONT VIEW OF ST. PETER'S, AT ROME.

ing in all its refulgence and majesty, and there is the darkness of superstition sinking to the most ignoble ideas; there is Piety firing its torch at the death pang, and Hope snapping the fetters of the grave; and there is asceticism glorying in the gloom of death, and triumphing in its own shame; there is the proud distinction of rank and title in life, and there the tomb frowns upon the lesser tomb in death. It must be a solemn lesson to the princes who reside within its precincts, to know that beneath the palace of their festivity lie their fathers' ashes, and the sculls which gleam down upon them in their festal chambers, set as they are in gems of gold, (oh! mighty satire on human life!) tell them that the shaft is winged which is to lay their dust in the mausoleum.

ST. PETER'S OF ROME.

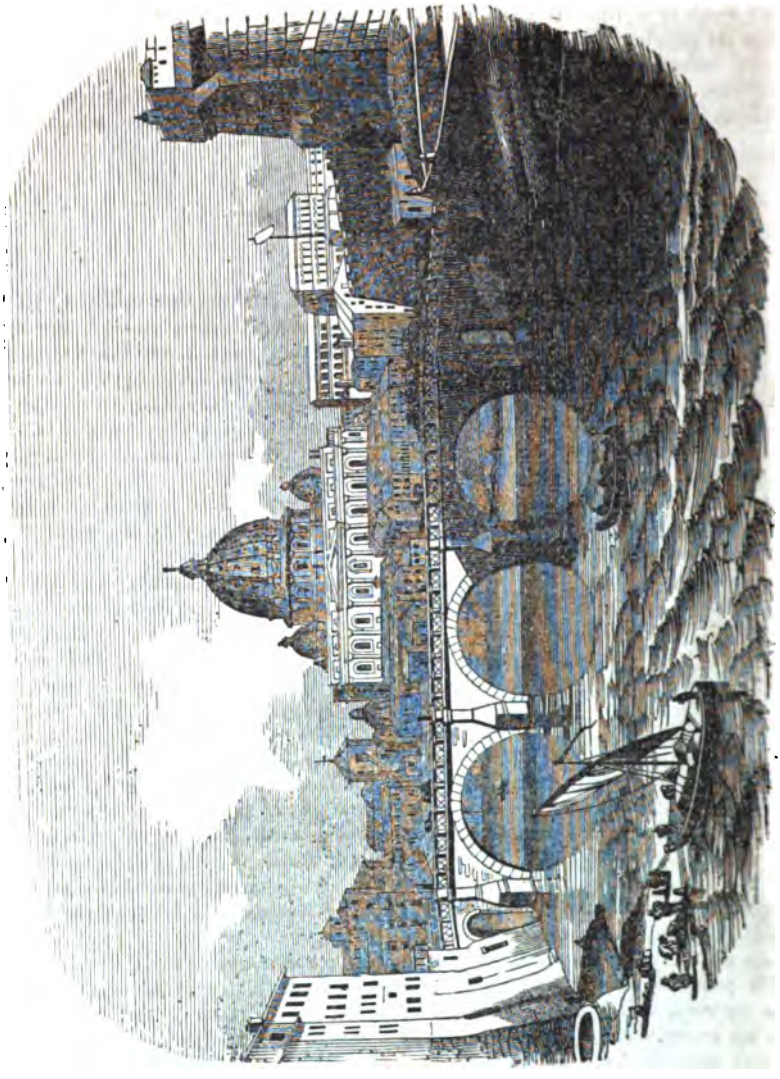
[See pages 358, 360.]

The piazza of this masterpiece of architecture is altogether sublime. The double colonnade on each side, extending in a semi-circular sweep; the stupendous Egyptian obelisk; the two fountains; the portico; and the admirable façade of the church; form such an assemblage of magnificent objects, as cannot fail to impress the mind with awe and admiration. The church appears in the back-ground, and on each side is a row of quadruple arches, resting on two hundred and eighty-four pillars, and eighty-eight pilasters; the arches support one hundred and ninety-two statues, twelve feet in height. The two noble fountains throw a mass of water to the height of nine feet, from which it falls in a very picturesque manner, and adds greatly to the beauty of the scene. In the centre is the fine obelisk.

At the first entrance into St. Peter's, the effect is not so striking as might be expected: it enlarges itself, however, insensibly on all sides, and mends on the eye every moment. The proportions are so accurately observed, that each of the parts is seen to an equal advantage, without distinguishing itself above the rest. It appears neither extremely high, nor long, nor broad, because a just equality is preserved throughout. Although every object in this church is admirable, the most astonishing part of it is the cupola. On ascending to it, the spectator is surprised to find that the dome which he sees in the church, is not the same with the one he had examined without doors, the latter being a kind of case to the other, and the stairs by which he ascends into the ball, lying betwen the two. Had there been the outward dome only, it would not have been seen to advantage by those who are within the church; or had there been the inward one only, it would scarcely have been seen by those who are without; and had both been one solid dome of so great a thickness, the pillars would have been too weak to have supported it.

It is not easy to conceive a more glorious architectural display than the one which presents itself to the spectator who stands beneath the dome. If he looks upward, he is astonished at the spacious hollow of the cupola, and has a vault on every side of him, which makes one of the most beautiful vistas the eye can possibly have to penetrate. To convey an idea of its magnitude, it will suffice to say, that the height of the body of the church, from the ground to the upper part of its ceiling, is four hundred and thirty-two feet, and that sixteen persons may place themselves, without inconvenience, in the globular top over the dome, which is annually lighted, on the 29th of June, by four thousand lamps and two thousand fire-pots, presenting a most delightful spectacle.

The vestibule of St. Peter's is grand and beautiful. Over the second entrance



VIEW OF ST. PETER'S FROM THE EAST, ABOVE THE BRIDGE OF ST. ANGELO.

is a fine mosaic from Giotto, executed in the year 1303; and at the corners, to the right and left, are the equestrian statues of Constantine and Charlemagne. Of the five doors leading to the church itself, one, called the holy door, is generally shut up by brick-work, and is only opened at the time of the Jubilee. The middle gate is of bronze, with bass-reliefs.

Of the one hundred and thirty statues with which this church is adorned, that of St. Peter is the most conspicuous: it is said to have been re-cast from a bronze statue of Jupiter Capitolinus. One hundred and twelve lamps are constantly burning around the tomb of this saint; and the high altar close to it, on which the Pope alone reads mass, is overshadowed by a ceiling, which exceeds in loftiness that of any palace of Rome. The splendid sacristy was built by Pius VI. But by far the greatest ornaments of the interior are the excellent works in mosaic, all copied from the most celebrated pictures, which are thus guarded from oblivion.

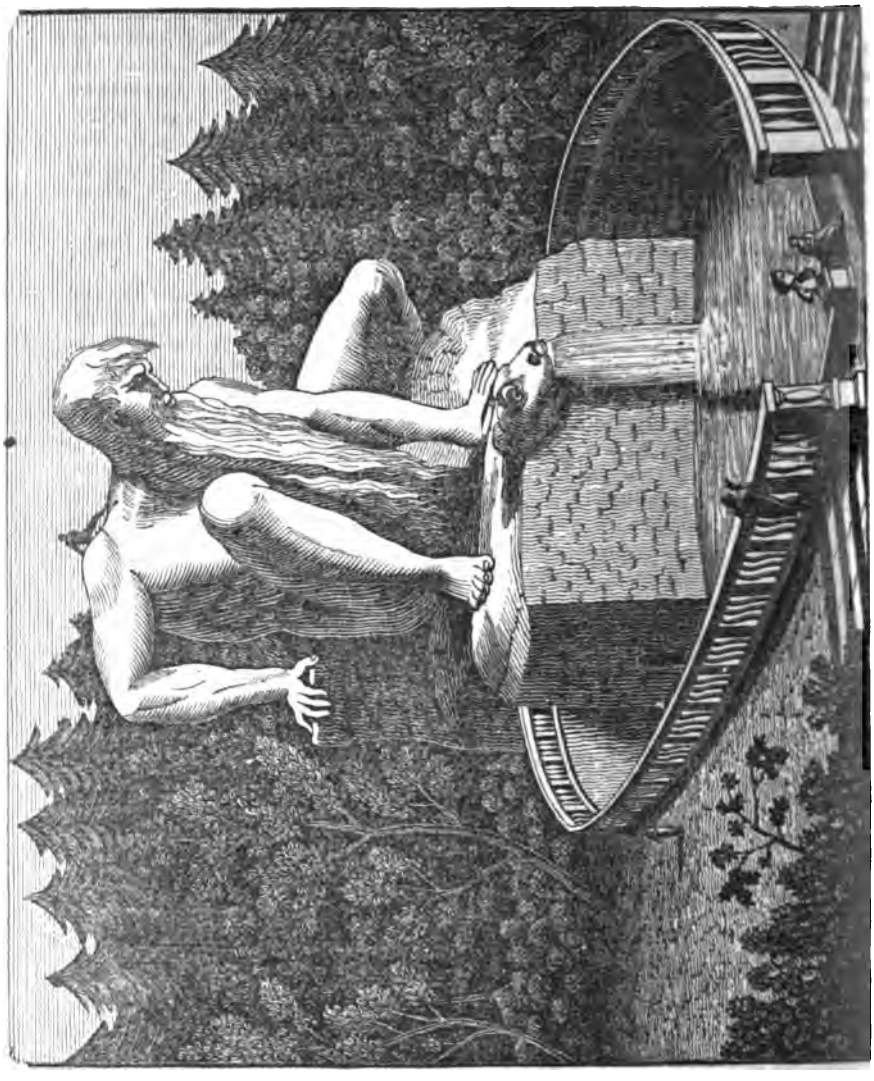
The great and truly awful dome of St. Peter's is only two feet less in diameter than that of the Pantheon, being one hundred and thirty-seven feet; but it exceeds the latter in height by twenty feet, being one hundred and fifty-nine feet, besides the lantern, the basis pedestal of the top, the globular top itself, and the cross above it, which, collectively, measure one hundred and twenty feet. The roof of the church is ascended by easy steps; and here the visiter seems to have entered a small town, for he suddenly finds himself among a number of houses, which either serve as repositories of implements and materials for repairing the church, or are inhabited by the workmen. The dome, at the foot of which he now arrives, appears to be the parish-church of this town; and the inferior domes seem as if intended only for ornaments to fill up the vacuities. Add to this, that he cannot see the streets of Rome, on account of the surrounding high gallery, and its colossal statues; and the singularity of such a scene may be easily conceived. It is besides said, that a market is occasionally held here for the aërial inhabitants.

Although the adventurous stranger is now on the roof, he has still a great height to ascend before he reaches the summit of the dome. Previously to his engaging in this enterprise, he is conducted to the inside gallery of the dome. From this spot the people within the body of the church appear like children. The higher he goes, the more uncomfortable he finds himself, on account of the oblique walls over the narrow staircase; and he is often compelled to lean with his whole body quite to one side. Several marble plates are affixed in these walls, containing the names of the distinguished personages who have had the courage to ascend to the dome, and even to climb up to the lantern, and the top. The Emperor Joseph II. is twice mentioned; and Paul I. as Grand Duke. In some parts, where the stairs are too steep, more commodious steps of wood have been placed: by these the lantern can be reached with greater facility; and the view which there waits the visiter, may be imagined without the aid of description; it is AN IMMENSE PANORAMA, BOUNDED BY THE SEA.

THE COLOSSAL FIGURE OF JUPITER PLUVIUS.

[See page 362.]

STATUES above the ordinary size were named by the ancients *Colossi*, from a Greek word which signifies "Members." That at Rhodes was the most famous, executed by Carelus, a pupil of Lysippus. There were several at Rome; the most considerable was that of Vespasian, in the amphitheatre, that bore the



JUPITER PLUVIUS, OR THE AUTUMNAL JOVE.

name of Collaxa. Claudius caused a colossal statue of himself to be raised on a rock exposed to the sea waves, in front of the palace of Ostium. Nero had his person and figure painted on a linen cloth, 120 feet in height. In the court of the Capitol, and in the place Farnesi, &c., are colossi, either entire or mutilated.

The space in which stands this enormous statue, is planted round on all sides with lofty fir and beech trees, the trunks of which are hid by a wood of laurel, wherein niches have been cut for statues. The middle part is a green lawn, and at a little distance is a semicircular basin of water, behind which rises the colossal statue of Father Apennine.

Incased, as it were, in the groves, it can only be surveyed in front, and from a point of view marked by the artist in the adjoining engraving.

Elevated on a base to appearance irregular, and of itself lofty, at which the astonished spectator arrives through two balustrades that run round the basin, this colossus at first looks like a pyramidal rock, on which the hand of man might have executed some project analogous to what the statuary Stasicrates had conceived respecting Mount Athos, and which Alexander nobly rejected. But soon he recognises the genius of a pupil and worthy rival of Michael Angelo.

It was, in fact, JOHN OF BOLOGNA, who, by an inspiration derived from the ancients, has executed their *beau ideal* of Jupiter Pluvius. This name seems more suitable to the figure than that of Father Apennine, which has been assigned to it. This style, in point of magnitude, is of the largest, and the character of the head is in perfect conformity to the subject. His brows and front brave the tempest, and seem the region of the hoar frost; his locks descend in tresses on his broad shoulders, and the flakes of his immense beard resemble stalactites; his limbs seem covered with rime, but with no alteration in their contour, or in the form of the muscles.

To add to the extraordinary effect, about the head is a kind of crown, formed of little jets d'eaux, that drop on the shoulders and trickle down the figure, shedding a sort of supernatural lustre, when irradiated by the sun.

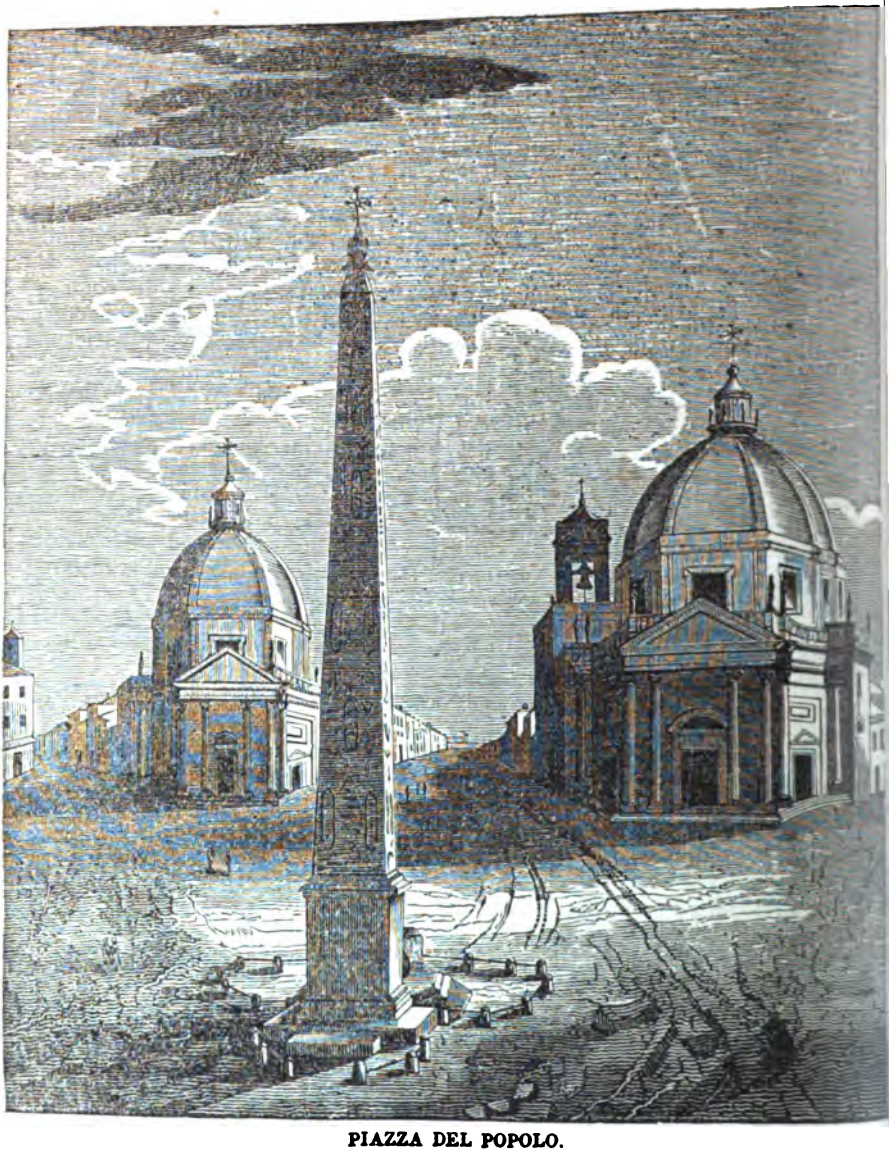
It would be difficult to imagine a composition more picturesque and perfect in all its proportions. The figure harmonizes with the surrounding objects, but its real magnitude is best shown by comparison with the groups promenading about the water, and which, in comparison, at a certain distance, resemble pigmies. A nearer approach exhibits a truly striking proportion of the limbs.

A number of apartments have been fabricated in the interior, and within the head is a beautiful Belvidere, wherein the eye-balls serve for windows. The extremities are of stone; the trunk is of bricks overlaid with a mortar or cement that has contracted the hardness of marble, and which, when fresh, it was easy to model in due forms.

It is related in the life of John of Bologna, that several of his pupils, unaccustomed to work with hand, while engaged in this work, forgot the correct standard of dimensions, both as to the eye and hand, and that Father Apennine and his enormous muscles made them spoil a number of statues.

The greatest difficulty in the workmanship was to impress on the mass the character of monumental durability. The artist has succeeded in uniting the rules of the statuary with those of construction, in combining the beauty of the one with the solidity of the other. All the parts refer to a common centre of gravity, and the members are arranged so as to serve for a scaffolding to the body, without impairing its dignity or magnitude.

The colossal statues of the ancients may have suggested the idea of this configuration, or, as before hinted, the artist may have aimed to represent the Jupi-



PIAZZA DEL POPOLO.

ter Plovius. However, it seems probable that Pussin, in his painting of the Plains of Sicily, has, from this, formed his Polyphemus, seated on the summit of a lofty rock. From the beauty of its proportions, and skill in the execution, all artists who have to work on colossal figures ought to cherish the preservation of this, as an imposing object, that cannot be too profoundly studied.

PIAZZA DEL POPOLO.

(See page 364.)

THE height of the ancient shaft of the obelisk in the Piazza del Popolo is about 79½ feet, but unfortunately it is not entire,—it has been broken in three pieces. Its whole height, with the modern base and substructure, is about 116 feet. Its sides are covered with hieroglyphics that are partially injured or defaced. It was erected where it now stands in the year 1589, by order of Sixtus V., who was the first of the popes to give attention to these magnificent relics of antiquity. Before erecting this one in the Piazza del Popolo, he had set three other obelisks upright on bases in different parts of Rome,—viz.: one in front of the church of St. Peter, in 1586; another in front of the church of Santa Maria Maggiore, in 1587; and the third in the square of San Giovanni Laterannense, in 1588.

As it now stands with its parts united, the obelisk in the Piazza del Popolo is, in size, next to the obelisks before the churches of St. Peter and St. John Laterran, being higher than the other nine Roman obelisks now erect. The sides of the stone are of unequal width; those on the north and south, which correspond, are seven feet ten inches at the base, and four feet ten inches at the summit. The other two sides or faces of the obelisk, at the same positions respectively, are, at the base, six feet eleven inches, and at top four feet one inch. The northern face of this obelisk has been much injured by fire. Some local writers have settled in their satisfaction that this injury was sustained during Nero's burning of Rome. It may, or it may not have been so, for Rome has been the scene of many a conflagration since then. A much better established fact is, that the obelisk in the Piazza del Popolo is one of two that the Emperor Augustus caused to be transported from Egypt to Rome, and erected in the Great Circus. Pliny says it was first quarried by an Egyptian king, during whose reign the philosopher Pythagoras visited Egypt. This would give the shaft an antiquity of more than twenty-three centuries. Their age, the mysterious country of their origin, the history of their importation into Europe by the conquerors of old Rome, their overthrow by the barbarous invaders of the empire, their re-erection by the popes of modern Rome, the innumerable vicissitudes and tragical changes that have occurred since they were first placed erect in the Circus Maximus, the Campus Martius, or similar spots of renown, all tend to give great interest to these obelisks, which are grand and imposing objects in themselves, and which, moreover, are seen in no other city in Europe.

VIEW OF CONSTANTINOPLE FROM GALATA.

CONSTANTINOPLE.

[See pages 366, 369.]

THIS magnificent city, which, won from the degenerate Greeks of the lower empire, has been for four centuries the capital of the Turkish empire, is situated in 41° 1′ 27″ north latitude, and in 26° 35′ of east longitude.

The ground it occupies is marked out by nature as the site of a great city. A gently declining promontory, secured by narrow seas, at the east of Europe, stretches out to meet the continent of Asia, from which its extreme point is separated by so narrow a strait that in a quarter of an hour a boat can row from one continent to the other. This strait or channel, which is called the Bosphorus, running about fifteen miles from the Black Sea, between the beautiful shores of Europe and Asia, looks like a stately river, until it sweeps by the angle of Constantinople and enters the sea of Marmora. But just before it is lost in that sea, it makes a deep elbow to the right, flowing between the triangle of Constantinople Proper, and its suburbs of Galata and Pera, and forming the port which is called the Golden Horn. This is the most convenient as well as the most beautiful harbor in the world.

A city was built here by a colony of Lacedæmonians as early as the year 660 before Christ, or about a century after the foundation of Rome; but this city only occupied the apex of the triangle, or precisely that space now within the enlosures of the Seraglio. It was called Byzantium. The present immense city, called Constantinopolis, or the city of Constantine, after its founder, was built about the year 330 of our era, by the Roman Emperor Constantine, who thought it the best place for the capital of the world.

The triangle which the city now entirely occupies is thus washed on one of its sides (the northern) by the deep waters of the port, and on the other (the south-eastern) by the sea of Marmora. The base of the triangle, or the ground immediately beyond the walls which attaches it to the European continent, is an open elevated flat, with some trifling inequalities of surface. The area of the triangle is occupied by gentle hills, which are highest towards the land side, and gradually decline to the Seraglio point, shelving off on either side to the sea of Marmora and the port. As Rome was built on seven hills, so the Roman founders of Constantinople called these "the seven hills," though, in fact, if the principal chain only were counted there would be less, and if the minor hills or spurs were taken into the account, there would be more than seven. On these hills the city stands, presenting on each of the three sides of the triangle the aspect of a stately amphitheatre. The ridge of the first hill, departing from the acute point of the triangle, is occupied by the Seraglio, or vast palace of the Sultan, behind which, a little on the reverse of the hill, the dome of Santa Sophia shows itself. The second hill is crowned by the mosque of the Osmanieh, whose dome is strikingly bold and lofty. The still grander mosque of Soliman the Magnificent, towers on the third hill; whilst an ancient aqueduct, whose bold arches have the happiest effect, unites the summits of the third and fourth hills. On the very highest point of the chain there is a lofty tower, built within these few years by the present Sultan, in which a guard is constantly placed to watch the breaking out of fires, which are very frequent and destructive in a city where all the private habitations are built chiefly of wood. Few things are more calculated to make an impression on the mind of the stranger than when an accident of this sort occurs at the dead of night, and the immense drum is beaten at the top of the tower, and the voice of the guard is heard shouting, 'Vangar' (fire).

Though there is one principal street, which, with but few interruptions, traverses the city from the Seraglio to the inland walls, the houses of Constantinople are not generally massed together, but interspersed with open spaces, gardens, trees, ancient ruins, and isolated mosques,—the tall, slim, arrowy minarets or towers of which, all kept purely white, and tipped with a gilded crescent, contribute greatly to the beauty of the views.

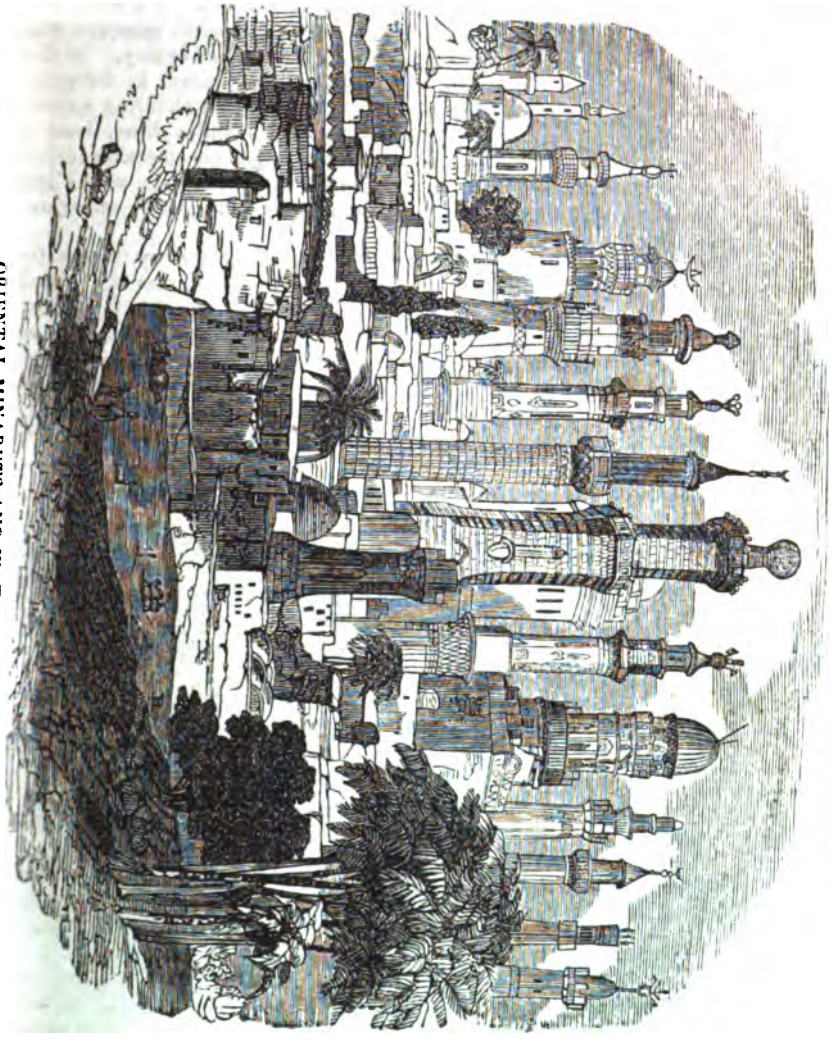
The situation of Constantinople upon hills is not only the cause of its beauty, but of its salubrity and comparative cleanliness. It catches all the pleasant breezes from the Bosphorus, the Marmora, and the adjoining plains of Thrace; and the dirt that might accumulate naturally descends the hill-sides to the port or the open sea, in both of which it is carried off by a strong current. To this advantage must be added the immense number of fountains, and the quantity of flowing water which is always carrying off parts of the dirt; and the heavy rains, which, when they fall, so wash the sides of the hills, that nothing can well be cleaner than the greater part of Constantinople at those seasons. Indeed, at any time, the lower edge of the city that touches the port, and the opposite suburb of Galata, may be called filthy places, but the term cannot be correctly applied to Constantinople as a whole.

Some ill-natured travellers have said that the only scavengers here are the unowned dogs which roam about in countless thousands; but we believe in all times there were a set of Turks employed to clean the streets, and the present sultan has certainly a regularly organized corps for that service.

Allowing for the empty spaces, which collectively would form a portion by no means inconsiderable, Constantinople occupies the whole of the natural triangle, whose outline is fringed by old walls flanked by towers. These walls and towers on the side of the sea of Marmora and the port, where in old times they were not required to be so strong, are now in a very ruinous state, and, in some parts, on the Golden Horn, have entirely disappeared. But on the land side, where the defences of art were more called for, Constantinople presents a treble line of most formidable ancient walls which might easily be repaired; and which, in their more dilapidated parts, offer such magnificent and picturesque specimens of mural ruins as no other city can boast of. The length of this latter line of wall, from the head of the port to the Seven Towers on the sea of Marmora, is above four English miles. The form of the triangle, as may be seen by our little plan, is somewhat irregular, having the side from the Seven Towers to the Seraglio considerably the longest. According to the best calculations, the population contained within these walls is about 500,000. If we add to this number, as is usually done, the population of the suburbs of Pera and Galata, of Scutari, which, though in Asia, is so near as to be considered a suburb, and of the numerous villages which closely succeed each other on both sides of the channel of the Bosphorus for several miles, we may arrive perhaps at the number of from 700,000 to 800,000 souls, comprising Turks, Greeks, Armenians, Jews, and Franks.

On whichever side you approach Constantinople,—whether ascending by the Dardanelles and the sea of Marmora, or descending from the Black Sea by the Bosphorus,—whether you arrive by crossing the plains of Thrace, or come in sight from the opposite hills of Asia,—she presents herself indeed like "the Queen of Cities." The effect of the first view is almost magical.

The whole circuit of Constantinople, which is calculated at somewhat more than twelve miles, offers, even to diligent research, very few remains of antiquity. The truth is, the Turks have availed themselves of the marbles and fragments of the Greeks in the construction of their own public edifices; and the antiquities of Constantinople are reproduced to the eye under entirely dif-

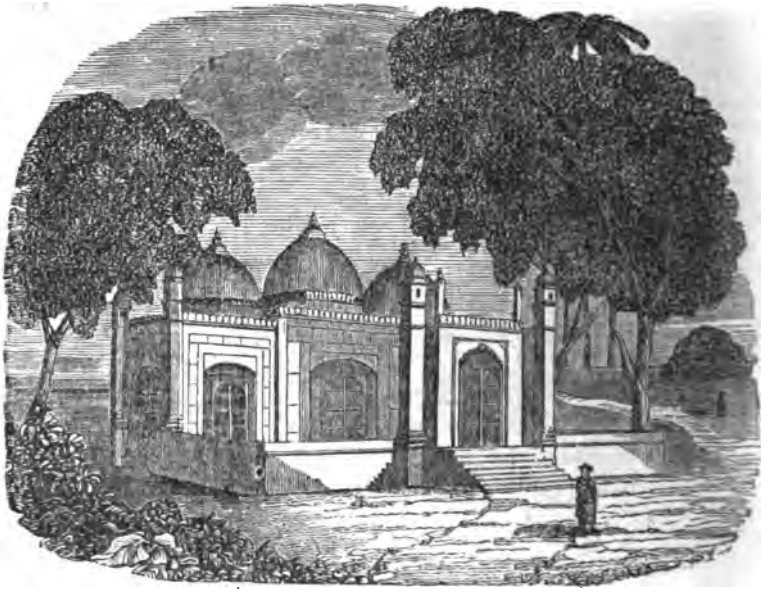


ORIENTAL MINARETS AND WATCHTOWERS.

ferent forms and combinations, in the mosques and minarets, the cemeteries and the fountains of the Osmanlys.

Many a beautiful work of the ancient Greek chisel has thus been imbedded in a wall, or cut down and defaced to make a Turkish tombstone; and many an edifice constructed in accordance with the pure styles of architecture has been levelled and used as a quarry. But still, it must be confessed that some of the Turkish buildings, and more particularly some of the imperial mosques which have risen in their places, are distinguished by grandeur and beauty. Of these imperial mosques there are fourteen, each lofty and magnificent in its general dimensions, and built from base to dome with excellent and enduring materials —chiefly of white marble slightly tinged with gray. Besides these, there are sixty ordinary mosques, varying in size and beauty, but all considerable edifices; and then, two hundred and more inferior mosques and messdgids, which latter are only distinguished as being places of worship, by having little minarets or towers contiguous to them.

The Turks may have borrowed these beautiful, light, arrowy towers from some eastern nations, but they certainly did not copy them from the Greeks. The minarets form undoubtedly one of the most striking and pleasing features in the architecture and scenery of Constantinople. Nothing, indeed, can surpass the effect produced on the nights of illumination at the Turkish capital, when long strings of lamps are hung in festoons from one to the other of these slender lofty towers. Near the summit of these minarets there is a little gallery, from which, at the five appointed seasons in the four-and-twenty hours, the Muezzin calls the Mahometans to prayer. The grand mosques have some two, some four, and one has even six, of these minarets.



Turkish Mosque.

The mosque which has been most talked of, because it was anciently a Christian temple, and was supposed to have suggested to the Turks the grand

dome, or cupola, which predominates in all the rest of their religious edifices, is that of Santa Sophia. Several of the imperial mosques, however, far excel Santa Sophia in situation, boldness, and beauty. If the Turks borrowed the dome from it, they have immensely improved on the original, which is comparatively low and heavy, whilst their cupolas are lofty, light, and graceful. This is particularly the case with the mosque of Sultan Achmet, which may be deemed, altogether, the grandest edifice in Constantinople. It stands on one side of the ancient square of the Hippodrome, from which it is separated by a beautiful low wall or screen, with three gates and seventy-two grated windows. Within this wall is a large court paved with marble, and ornamented in the midst by a beautiful fountain, of the same material, and of hexagonal form. The basis of the mosque occupies a stately square. Its elevation is exceedingly bold and striking; its proud dome rests on columns of massive proportion, and its minarets, which shoot high above the dome, have three circular galleries each. In the court below there runs a covered gallery formed of twenty-six arcades, each with its cupola neatly covered with lead, and supported by twenty-six columns of Egyptian granite, having bases of bronze and Turkish capitals. The view of this magnificent mosque from the ancient spiral bronze column, or from the ancient obelisk in the middle of the Hippodrome, with the broad dome of Santa Sophia in the distance, is one of the finest Constantinople can offer.

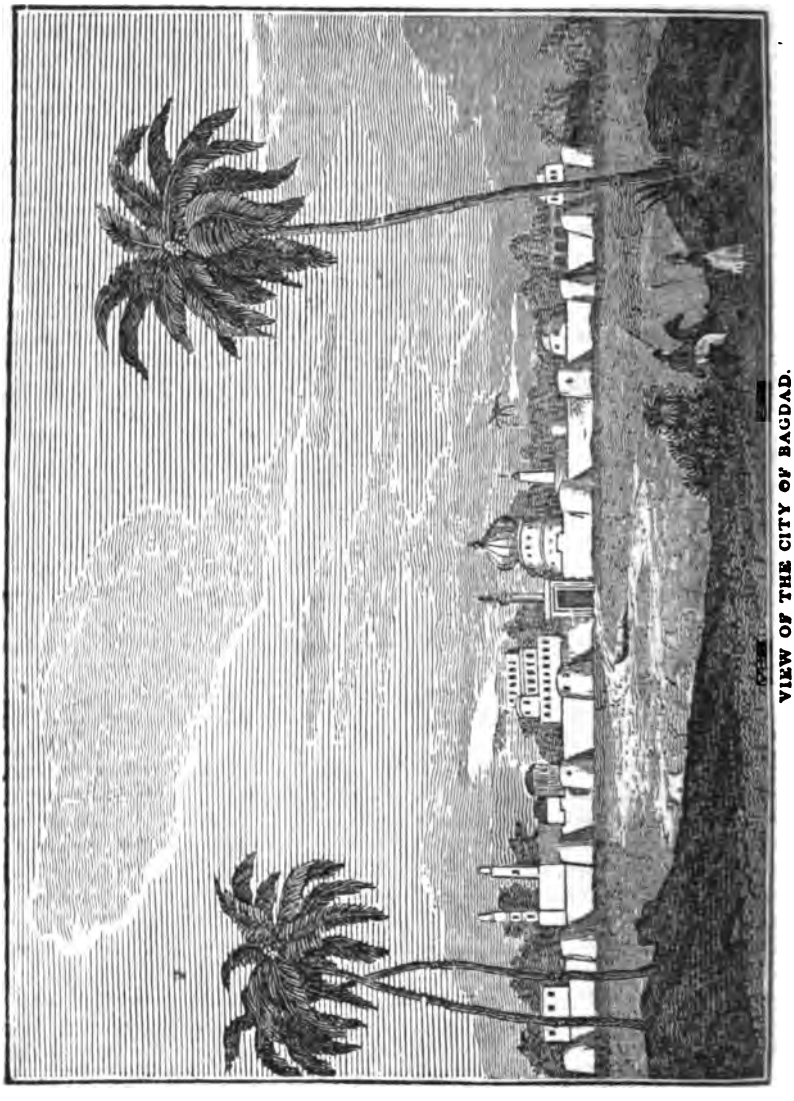
BAGDAD.

[See page 372.]

This is the capital of a Turkish pachalic of the same name, in the southern part of Mesopotamia, containing about 70,000 square miles, and 650,000 inhabitants. The greatest part of it lies on the eastern bank of the Tigris, which is crossed by a bridge of boats, 620 feet long.

The modern city is surrounded with a brick wall, six miles in circuit, and with a ditch from five to six fathoms deep, which may be filled with water from the Tigris; but the cannon on the numerous towers are old and unfit for use. The castle commands the Tigris, and contains an arsenal, but is untenable. The houses, mostly built of brick, are but one story high, the streets unpaved, and so narrow that two horsemen can scarcely ride abreast. The houses of the wealthy are distinguished by a better sort of architecture. The palace of the governor is spacious, and magnificently furnished. The public baths, and the coffee-houses of the city, though in a bad condition, are much frequented. The markets afford an abundance of provisions at a low price.

Bagdad is an important mart for Arabian, Indian, and Persian productions, as well as for European and American manufactures. A splendid view is afforded by the bazars, with their twelve hundred shops, filled with all kinds of oriental goods. The chief manufactures of the city are red and yellow leather, much esteemed, and silk, cotton, and woollen cloths. With the aid of the English and Persians, the pacha has established a cannon foundry. This city supplies Asia Minor, Syria, and part of Europe, with East India goods, which are imported to Bassora, ascend the Tigris in boats, and are carried by caravans to Tokat, Constantinople, Aleppo, Damascus, and the western parts of Persia. There is also some trade in jewels. An English packet runs between Bagdad and Bassora. A multitude of strangers assemble at Bagdad, partly on mercantile business, partly to visit the sepulchres of the saints, among



VIEW OF THE CITY OF BAGDAD.

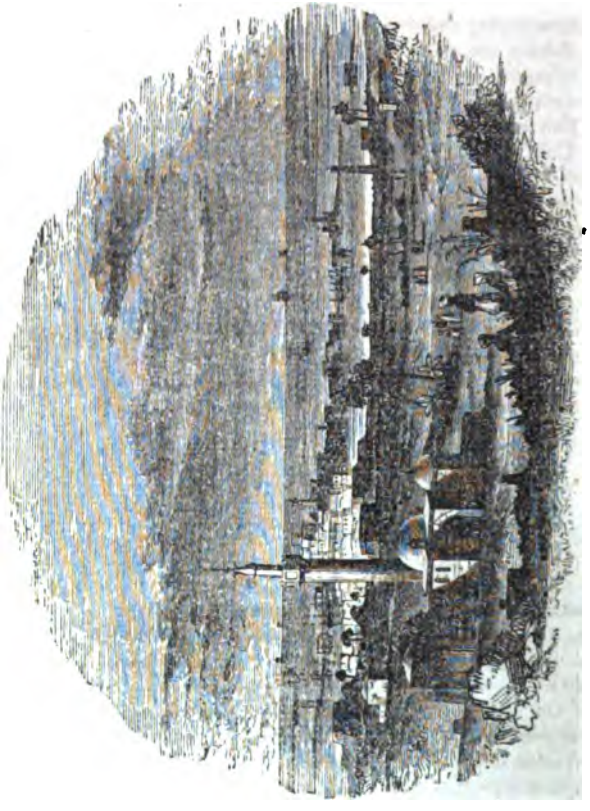
which is that of the prophet Ezekiel. The heat of the summer obliges the inhabitants to shelter themselves in subterranean chambers, but the winter is cold enough to make a fire necessary. The city is nevertheless agreeable, healthy, and free from pestilential diseases; but the inhabitants frequently suffer from cutaneous disorders.

Bagdad is inhabited by Turks, Persians, Armenians, Jews, and a small number of Christians. The Turks compose three-fourths of the whole population. The Jews are confined to a secluded district of the city, and are in a very oppressed condition. Inclusive of the Arabs, Hindoos, Afghans, and Egyptians, who are accustomed to reside here, the population may amount to eighty thousand. The Persians, under the particular protection of the government, enjoy a very extensive trade, and are celebrated for honesty, prudence, and integrity. The higher classes are more civil and attentive to strangers than is usually the case with Mohammedans. On the other hand, the lower classes are infected with the prevailing vices of the East. The people are bold, enterprising, and turbulent. The city, of which a general view is given above, was begun in 762, by the Calif Abu Giafar-Almanzor, finished in four years, and raised to a high degree of splendor, in the ninth century, by Haroun Alraschid; but one hundred years after it was destroyed by the Turks. In the thirteenth century, it was stormed by Holagou, grandson of Zingis Khan, who caused the reigning calif to be slain, and destroyed the califate. The descendants of the conqueror were expelled, in 1392, by Tamerlane, and in 1402, by Kara-Yusef. In the following century, Shah Ismael, the first sovereign of Persia of the house of Sofi, took possession of the city. From that time it was a perpetual subject of contest in the wars between the Turks and Persians. After a memorable siege, in 1638, it was conquered by the Turkish emperor, Amurath IV., and Nadir Shah endeavored in vain, in the eighteenth century, to wrest it from the Turks.

ALEXANDRIA.

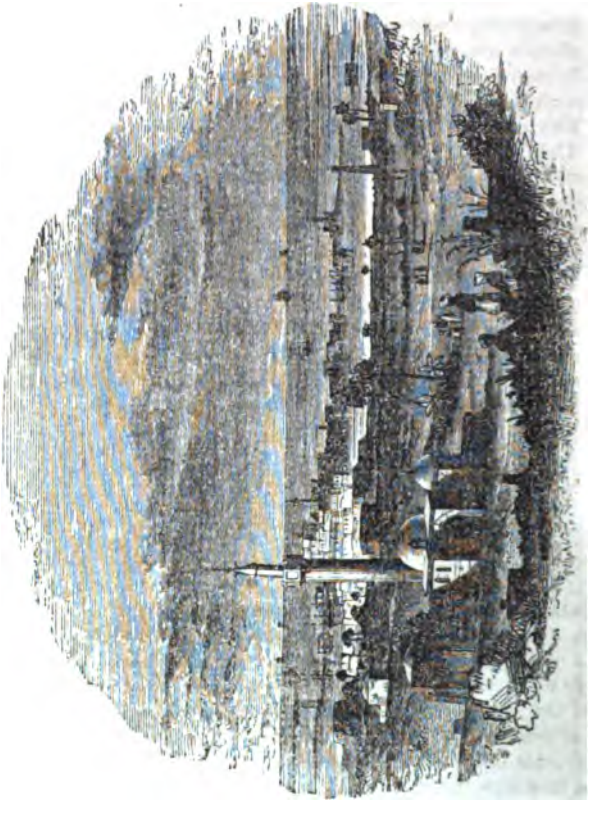
[See pages 374, 375, 377.]

ALEXANDRIA owes its origin to Alexander the Great, who, during his visit to Egypt, (B. C. 332,) gave orders to erect this city between the sea and the Mareotic Lake. The architect was Dinocrates, a Macedonian. A large part, but not the whole of it, was contained within the present walls, which are chiefly the work of the Arabs. One main long street, thirty stadia in length, ran through the city from the eastern extremity to the Necropolis at the western, and this was intersected by another main street, ten stadia in length, running nearly north, in a direction from the Mareotic Lake. The object of this arrangement was to give the city the benefit of ventilation from the north winds. The main land and the island of Pharos were connected by a dike, called the Heptastadium, in which, at each end, there was a passage for vessels from one port to the other. Over these passages there were also bridges; and we are told that water was conveyed along the dike to the island of Pharos, though we do not understand how this was managed, unless the bridges must have been very high. On the rocks now occupied by the present Pharos, a magnificent lighthouse was constructed by Sostratus of Cnidus, in the reign of Ptolemy Philadelphus (B. C. 283): its height is stated, though probably with much exaggeration, to have been 400 feet. The point opposite to the Pharos was called Lochias; and as the Lochias itself was prolonged towards the Pharos along



VIEW OF ALEXANDRIA.

CLEOPATRA'S NEEDLE.



VIEW OF ALEXANDRIA.

CLEOPATRA'S NEEDLE.

some rocks, on which the Pharillon now stands, this prolongation received the name of Acro-Lochias, or the Point of Lochias. In advancing from Lochias towards the obelisks, we traverse the ground where stood the palaces of the Ptolemies, the theatre, and various temples. The port bounded by the two promontories, by the north-east part of the city, and the Heptastadium, was called the Great Port. The other port was called Eunostus (safe return): it contained also a small port called Kibotos, or "the chest," because the entrance could be completely closed; no traces of it, as far as we can learn, can be made out. A canal which united the lake with port Eunostus terminated in or near port Kibotos, and was nearly the S. W. limit of the city. Still farther S. W. was the Necropolis (city of the dead), or great cemetery of Alexandria. This city in its full extent was divided into several quarters, but we cannot assign either the names or the exact limits of each. The court end, otherwise called Bruchion, comprised the part between the Lochias, the site of the Obelisks, and the eastern or Rosetta gate. It contained also the Museum. The Rhacotis bordered on port Eunostus, and contained the great temple of Serapis, which, after the establishment of Christianity, was for a long time a grievous offence to the Christians. Theophilus, the patriarch of Alexandria, obtained permission from the emperor Theodosius (A. D. 390) to destroy this edifice; and no one could accuse him of executing the commission imperfectly. A place called *Soma* (the body), in the quarter of the palaces, contained the tomb of Alexander the Great. Besides the canal which united the port Eunostus with the lake, there was also a canal from the lake to the town of Canopus, situated near the mouth of the western branch of the Nile. By means of this canal the city was supplied with river water, which was kept in cisterns. These were so numerous that a Roman writer tells us, "nearly all Alexandria was undermined, and furnished with subterranean aqueducts to convey the Nile water to private houses, where after a short time it became purified." Innumerable traces of such constructions are found on the site of old Alexandria.

The city was embellished by the Ptolemies with the spoils of the ancient towns of Egypt, and for several centuries continued to receive accessions and improvements. At one time it was the rival of Rome in size, and the first commercial city of the earth. It became, what Tyre had been before, the point of exchange for the eastern and western world, but with a commerce more widely extended after the conquests of the Macedonians had laid open the eastern world to Greek enterprise. Diodorus, who visited Alexandria just before the downfall of the empire of the Ptolemies, says, that the registers showed a population of more than 300,000 free citizens.

The enclosure, which is surrounded by a double wall flanked with lofty towers, contains the remains of old Alexandria,—an almost shapeless mass of rubbish, in which we see fragments of broken columns and capitals, pieces of wall, cisterns half choked up with earth, bits of pottery, glass, and all the signs of complete desolation. There are five gateways or entrances into this enclosure. Of the two granite obelisks, commonly called Cleopatra's Needles, one is still standing; the other is lying near it on the ground. The dimensions of the two are pretty nearly the same. The whole height of the erect obelisk, including the pedestal and the three steps, all of which are covered with earth, is about seventy-nine feet. When the French examined the base of this obelisk, the accumulation of earth around it was about sixteen feet deep. It has suffered considerably, like all the remains, and even the natural rocks of Alexandria, from the action of the atmosphere; the west side is in the best state of preservation, and the south the worst of all. These two obelisks formed the entrance to the temple or palace of Cæsar, as it is called,

POMPEY'S PILLAR.

though there is no doubt that they were moved from some of the ancient cities of Egypt by the Ptolemies. Near the two obelisks is part of a tower called "the Tower of the Romans," and probably it may be correctly named.

About the centre of the enclosure stands the mosque of St. Athanasius, on the site of a Christian church erected by this patriarch during the fourth century. In this mosque the French discovered the beautiful SARCOPHAGUS of Egyptian breccia, which is now in the British Museum. It was ungenerously required of the French at the capitulation of Alexandria (1801), together with other monuments of antiquity, which they had collected with great pains. Near the mosque are the shafts of three colossal pillars of red granite, which are the only remains of a large number that once existed in this part of the city; but it is not possible now to determine to what kind of an edifice they belonged.

The cisterns for keeping the Nile water are still in great part preserved. They consist of vaulted chambers supported by columns, which form arcades of two or three stories. The interior walls are covered with a thick red plaster that is not permeable to water. The level of these cisterns varies, but some of them are from fifteen to eighteen feet below the level of the sea. At the time of the French occupation of Alexandria, there were about 308 of these cisterns known to exist, though many more are doubtless buried beneath the rubbish: the number in use at that time was 207.

The only remarkable monument between the wall and the lake is the column commonly called Pompey's Pillar. It stands on a mound of earth about forty feet high, which contains remains of former constructions. The shaft, which consists of a single piece of red granite, is about sixty-seven feet long, and weighs at least 276 tons: the whole height, with the capital, which is in bad taste, and the base and pedestal, which are no better, is about ninety-four feet. According to a Greek inscription on the plinth of the base, on the west side, it appears to have been erected (though perhaps not for the first time) in honor of the emperor Diocletian, by a prefect of Egypt, whose name cannot be further deciphered than that it begins with PO. The foundation of this pillar has evidently often been examined, probably with the hope of finding treasures; and it is, perhaps, owing to this disturbance that it is inclined about seven inches to the S. W. Amidst the broken materials around its base we discover the centre stone on which it rests; this is a piece of yellowish breccia, with Egyptian hieroglyphics on it, placed the wrong end upwards.

Having crossed the canal, in going S. W. from the pillar, we come to some catacombs cut in a small elevation of a sandy calcareous stone; and farther south, in the calcareous rock that faces the sea, we find almost countless excavations, in the sides of which niches are cut: these once formed part of the Necropolis, or burial-place of old Alexandria. The most spacious of these, which, like the rest, communicates with the sea by a narrow passage, is about 3830 yards S. W. of the column, and is near the place called by the inappropriate name of Cleopatra's Baths. In the interior we find a great number of chambers and passages cut in the rock, in such a style of decoration as proves their Greek origin. Such a monument could only be intended for a king.

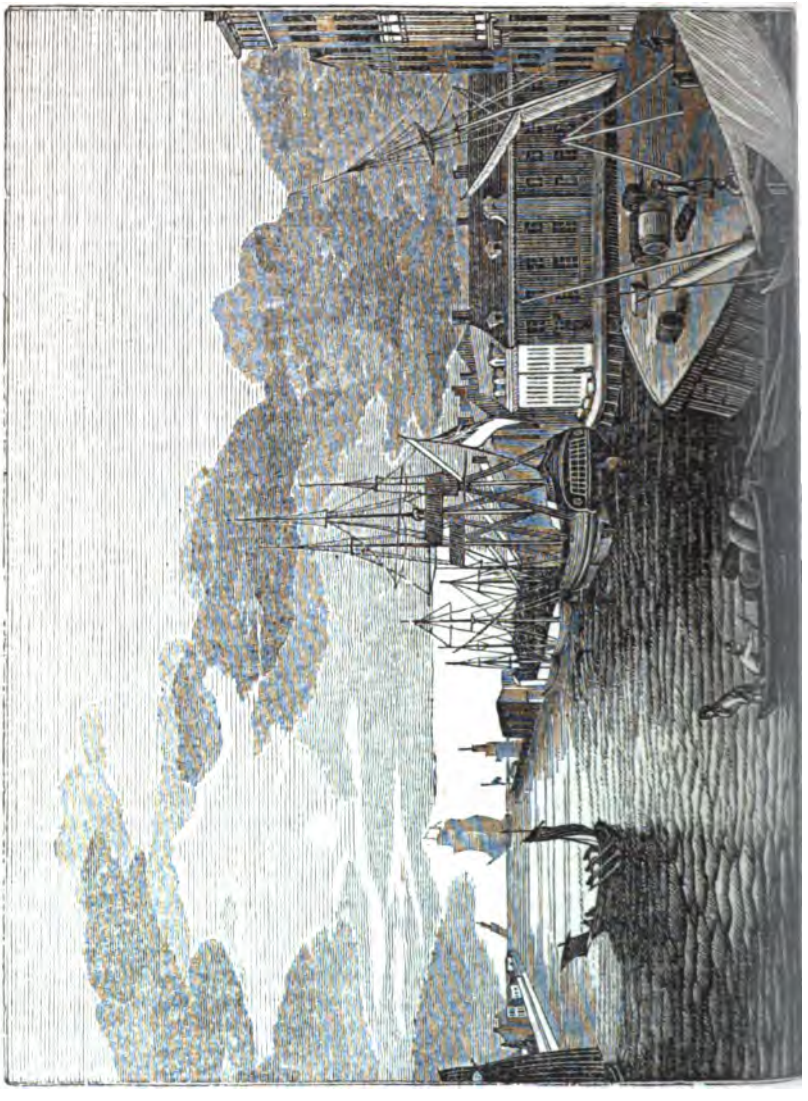
HAVRE.

[See page 380.]

HAVRE is a large commercial town in the north of France, and is situated at the influx of the Seine into the English channel. This town is strongly fortified, being surrounded by walls and defended by a citadel, which is considered the most regular and best constructed in France. It is believed to have been founded by Louis XII., but when Francis I. ascended the throne, in 1515, it was but a mere creek, in which fishermen sought refuge in stormy weather, having only a chapel dedicated to our Lady of Grace, which has disappeared, and a tavern or house of refreshment, still existing, with a boat and boatmen, rudely carved on stone, which was probably its sign. Francis I. built a town here, and fortified it against the English. By a curious destiny, Francis lost the battle of Pavia and his liberty, and Havre was almost destroyed by an inundation in the same year. Restored to France, he reconstructed Havre, and in the port built a ship of a thousand tons, colossal in his time, having on board a forge, windmill, chapel, tennis-court, and perfect in all respects—except that it would not float—as appears from Rabelais. In 1545, a fleet of two hundred vessels, in the roadstead of Havre, menaced Henry VIII. and England. Francis I. came to Havre with his court, and gave a grand fête on board the "Philip." During the rejoicing, the ship-kitchen took fire; the ship was instantly in a blaze, and the royal party had hardly left it when, in the midst of the flames, a hundred cannon, charged for the purpose of being fired off in honor of the fête, thundered with a single and most tremendous volley, by which the ship was destroyed, and several lives lost.

The reformed religion was that of the majority of the inhabitants of Havre; and the protestants called in the English to their aid in October, 1562. The English being obliged to surrender the town by capitulation, after twenty-two days' siege, departed with the honors of war, and an epidemic, by which more than twenty thousand perished in London, during the three months succeeding the return of the fleet. Cardinal Richelieu, next to Francis I., was the great benefactor of this town. He improved the harbor, built fortresses, and established a foundry, every cannon from which bore his name. Havre was bombarded by William III. in 1694, and by Admiral Rodney in 1759. It was not till 1786 that the great public works which now distinguish it were projected. Here Sir Sidney Smith, in 1796, by an enterprise of rare hardihood, cut out the French cruiser "Le Vengeur," and, by an equally bold manœuvre of the second in command of the Vengeur, was taken into Havre on board his own prize.

Bonaparte visited Havre for the first time in 1802, after the peace of Amiens, and saw its capabilities for being the first town in France in maritime commerce, and the best roadstead for the most numerous fleet. He again visited it in 1810, with the empress Maria Louisa. To him Havre owes the great improvement of its port and its public works. The cocks and sluices, on a peculiar site and grand scale, are the most important and interesting of the public works. The docks form a segment of a vast circle, partly embracing the town, with the quay for its base. In these, some vessels ready for sea, others with their keels up, others again new built but not launched, with the din of hammers and general movement, give proof of active and extensive commerce. The port consists of three basins, separated by four sluices, which admit the passing of two frigates. The roadstead of Havre is capable of holding the whole navy of France, and may be entered with almost any wind. Its special com-



merce is the direct import of colonial produce, and the export of the manufactured goods and produce of France; but it carries on also an extensive trade with the United States of America and maritime states of Europe. Within a few years after the restoration of the Bourbons and the peace, it has taken the lead of all the French ports in the Atlantic, and especially invaded the trade of Bordeaux. There are two light-houses on the summit of La Heve, which command a view of the sea at twenty leagues' distance. Havre has also considerable manufactures of several kinds, of which the principal are tobacco, cordage, lace, sugar, china, vitriol, paper, and cotton.

The town is surmounted by the beautiful suburb of Ingouville, on the brow of a hill, partly wooded, and partly studded with pretty houses, having an extensive view of the sea. Havre contains nearly thirty thousand inhabitants.

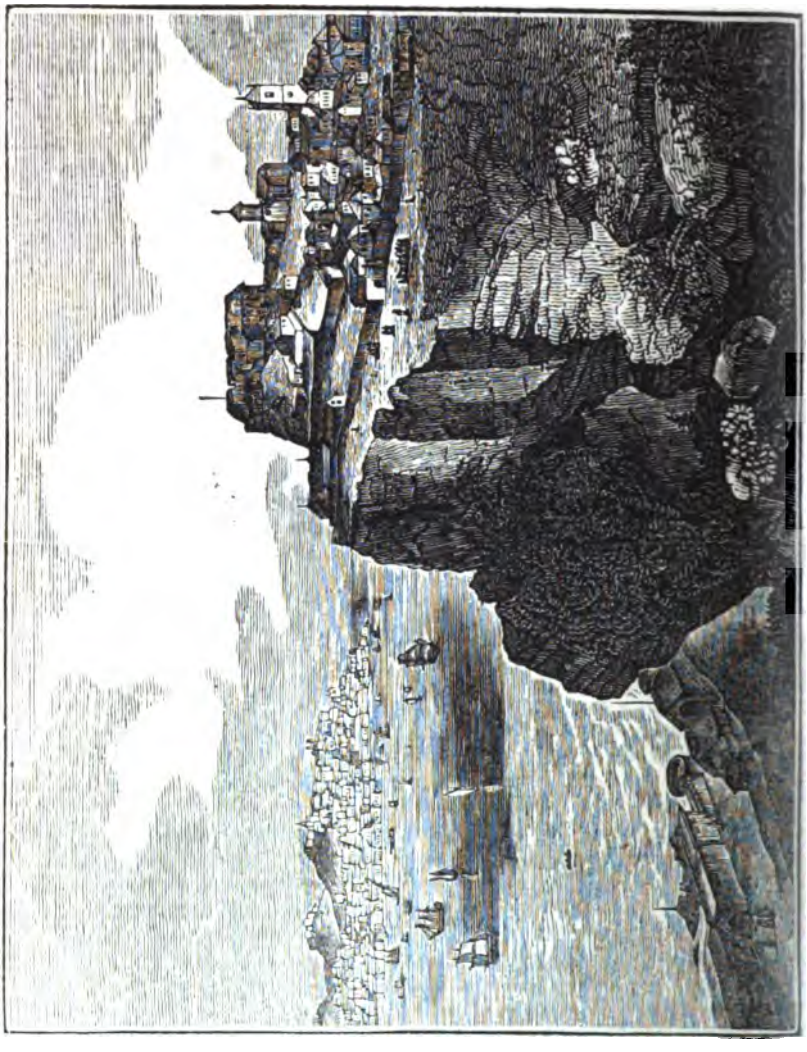
LISBON, VIEWED FROM FORT ALMADA.

[See page 282.]

The city of Lisbon is beautifully situated on the north side of the Tagus, about ten miles from the sea. Like old Rome, it stands on seven hills. Lisbon has one of the finest harbors in the world, which is capable of containing upwards of 10,000 sail of shipping without being crowded.

Before the dreadful earthquake in 1755, most of the private houses made a very miserable appearance; but now it has many magnificent buildings, particularly the square called *Rocio*. Previous to that calamity it contained about 20,000 houses, 150,000 inhabitants, 40 parish churches, besides its monasteries, 6 gates on the side of the Tagus, and 17 on the land side. It had 20 monasteries for monks, and 18 nunneries. According to Mr. Barretti, he "supposes two-thirds of the city were levelled with the ground, and such as withstood the shock received considerable injury. Besides these, a great number of large churches were thrown down and destroyed, two royal palaces, and many convents, nunneries, hospitals, and other public edifices. The king and royal family were in their carriages, passing to a palace in the country, and, happening to be in an open space, were rescued from the miserable fate which they witnessed all around them. Many who had lived in opulence, ease, and splendor, were reduced to the most distressing want, even of the common necessaries of life; while lingering and tormenting deaths awaited thousands who were overwhelmed by the falling buildings, or consumed by the spreading flames, which sprang from the numerous fires, and formed an almost general conflagration. Those of the wretched inhabitants who escaped destruction in these horrid dangers were forced to reside in the open air, scarcely able to procure a sufficient subsistence for their almost exhausted bodies." Mr. Barretti says, "that 30,000 persons are supposed to have been lost on that fatal day. Imagination can scarcely form to itself a scene of confusion, horror, and death more dreadful than this. After the shocks of the earth had subsided, the fire continued raging for many weeks, by which the pestilential air, produced from the numerous dead bodies, was purified, and the surviving remnant of the inhabitants happily preserved their health, although surrounded by putrefaction."

For the security of Lisbon there is a fort at the mouth of the river on each side, and a bar that runs across it, and which is very dangerous to pass without pilots. Higher up, at a place where the river is considerably contracted, there is a fort called *Torre de Belem*, or the Tower of Belem, under whose guns all ships must pass in their way to the city; and on the other side are several



LISBON, VIEWED FROM FORT ALMADA.

other forts. The king's principal palace is seated on the river, and is large and commodious. Of the hospitals, that called the *Great* is worthy of particular notice. This hospital is obliged to receive all persons, of whatever degree, nation, or religion, without any exception. At the village of Belem, near Lisbon, is a noble hospital for decayed gentlemen who have served the king, and have not a sufficiency to maintain themselves. That called the *House of Mercy* is also a noble charity. In the centre of the city, upon one of the highest hills, is the castle, which commands the whole, being large and ancient, and having always a garrison of four regiments of foot. The cathedral, a heavy Gothic edifice, contains great riches.

The famous aqueduct of Alcantara, which supplies the city of Lisbon with water, is a noble work, and deserves the attention of every traveller: it is composed of two different kinds of arches, the one Roman, the other Gothic, by which the uniformity of the building is destroyed. Although the earthquake was so dreadful in Lisbon and its vicinity, this building withstood the shock, with the exception of some of the key-stones being thrown out, when the centres closed again. At the village of Belem are a handsome royal palace, and a magnificent monastery, dedicated to St. Jerome; and the whole circumjacent country is extremely pleasant, abounding in olives and other fruit-trees. Lisbon contains about 200,000 inhabitants.

THE BRIDGE OF SIGHS.

(See page 384.)

I stood in Venice, on the Bridge of Sighs,
A palace and a prison on each hand;
I saw from out the wave her structures rise;
As from the stroke of an enchanter's wand,
A thousand years their cloudy wings expand
Around me, and a dying glory smiles
Over the far times when many a subject land
Looked to the winged lion's marble piles,
Where Venice sat in state, throned on her hundred isles.

Byron.

There are few places which stand connected with a train of more interesting associations than Venice. Its former opulence and power, the eventful characters of its history, its present degradation, the classic recollections attached to it by those poets who have either celebrated its former greatness, or mourned its present condition—Shakspeare, Tasso, Milton, Byron—all these things are calculated to invite inquiry, and inspire a melancholy interest. And perhaps there are few spots in Venice more adapted to produce this effect, than that which forms the subject of the following engraving—the Ponte dei Sospiri, or Bridge of Sighs, connecting the Ducal Palace with a state prison. The former was an erection of the ninth century, and is built in a style of rather Saracenic than Gothic, like most of the other buildings of Venice. The latter was built at a subsequent time, in consequence of a circumstance which is thus stated by Coryat, in his "Crudities."—"Before this prison was built, which was not (as I heard in Venice) above ten years since, the town's prison was under the duke's palace, where it was thought certain prisoners, being largely hired by the king of Spain, conspired together to blow up the palace with gunpowder, as the papists would have done the Parliament House in England; whereupon the senate thought good, having executed those prisoners that were conspirators in that bloody design, to remove the rest to another place, and to

THE BRIDGE OF SIGHS.

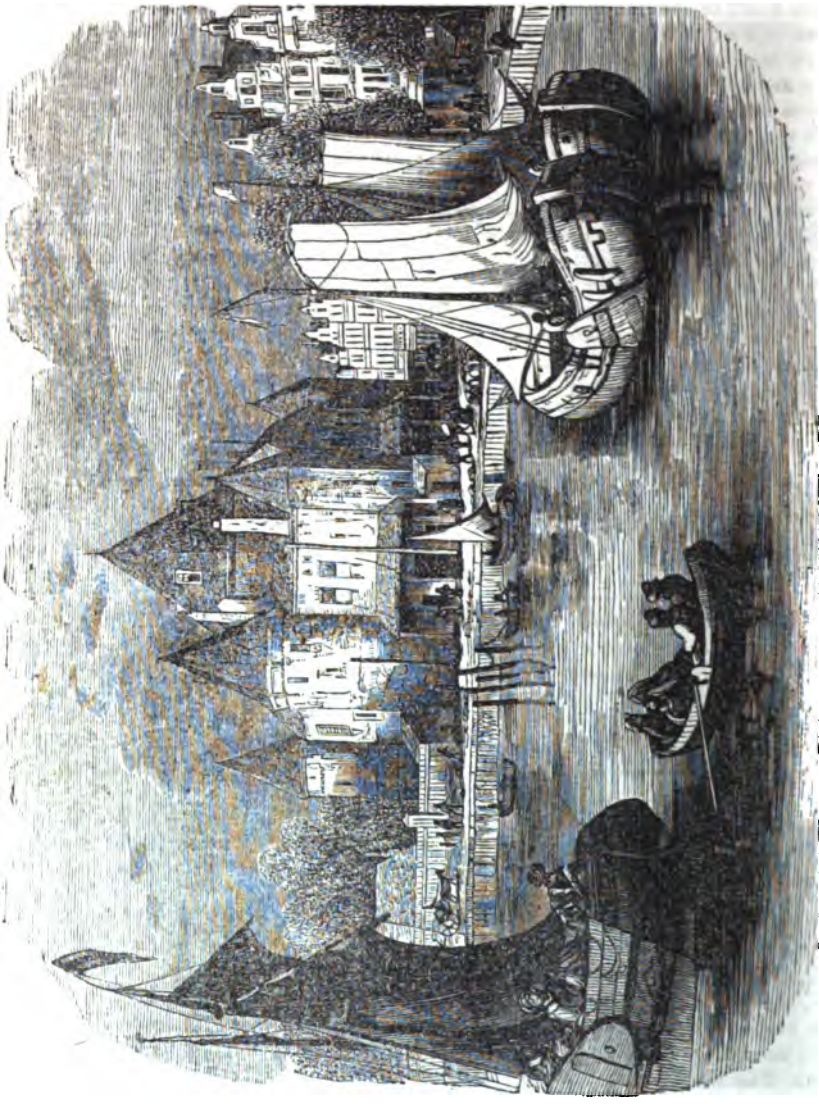
build a prison where this new standeth." The history of this latter edifice offers nothing to notice but what is of a painful and revolting character. It is, in fact, one of those scenes of torture, murder, and arbitrary and inhuman confinement, which are commonly to be found in countries which, like Italy, have suffered under the rule of superstition and tyranny. It is thus described by Mr. Hollier, in his Journal of a Tour through this and other countries, a work which strongly exhibits the most desirable qualification of a traveller—acute, persevering, and impartial observation. "Our next walk was to the Bridge of Sighs, and then down to view the dungeons. The Bridge of Sighs was, without question, a very correct appellation for that miserable path which led the poor unfortunate objects of tyrannical hatred or superstition to such a Tartarus of wo as is there witnessed. Descending by a steep and narrow stone staircase, just wide enough to admit one person at a time to walk, we arrived, after traversing a passage of the same dimensions, at some holes, ranged in rows along this horribly confined place, and withal so low as obliged us to stoop our chins nearly to our knees to enter them, and, when in, we found it impossible to stand upright; some of them were all but dark, the greater number of them completely so. And below these another range, inferior in every sense, more close, more loathsome, and into which neither the light nor breath of heaven could possibly enter, as they are situated below the level of the canals. Surely the poor creatures destined to be inmates of these abodes of wretchedness must, on entering them, have bid a final adieu to hope in this world."

AMSTERDAM.

[See page 386.]

Amsterdam was originally a salt marsh, and in order to make a foundation for houses, it was necessary to drive large piles of wood or rather masts through a layer of peat, which in some places is said to be forty or fifty feet thick. The nature of the soil may differ somewhat in different parts; the following facts will show still better its character. In 1605, a well was dug in one of the hospitals of Amsterdam (Oude Mannen en vrouwen Gasthius) to the depth of 232 Dutch feet. After seven feet of earth, there were found nine feet of peat, and then soft clay, sand, earth, clay rather hard, and earth, altogether making fifty-one feet of depth. Then came ten feet of sand, in which stratum the piles of Amsterdam chiefly rest. At the depth of seventy feet there was found one foot of pieces of peat. Sand, through which they did not make their way, was found at the depth of 232 feet.

Such is the substructure of a town which now contains above 200,000 inhabitants. The streets are generally in straight lines along the banks of the canals, which intersect the city; among the finest are the Heeren Graft or Gragt, and the Keizers Gragt, both of which are magnificent streets. Those in the central parts of the town are narrow and without foot-pavement. The private houses are nearly all of brick, painted and ornamented with different colors. The Kalver Straat is filled with shops for jewellery, porcelain, china, books, pictures, and other articles of luxury, and though narrow, this defect is compensated by the rich display of merchandise. Several of the streets are lined with fine rows of elms, walnut-trees, and limes. The canals within the town, or *gragten*, as the Dutch call them, are so numerous that the city is divided into ninety islands, which communicate by 290 bridges: the Amstel itself divides the town into the eastern or old, and western or new part, and is crossed



The Weighing House, formerly called St. Anthony's Gate, at Amsterdam.

by a bridge, the Amstel-Brug, partly built of brick, and partly of stone, with thirty-five arches; it is about 610 English feet long, sixty-four and a half wide, and furnished with iron balustrades. Through the eleven central arches large ships pass. Near the bridge is the great sluice, (Amstelsluis,) by which the waters of the river can be either dammed out, or allowed to flow through the city. By shutting the gates the course of the Amstel is stopped, and the country round the city laid under water.

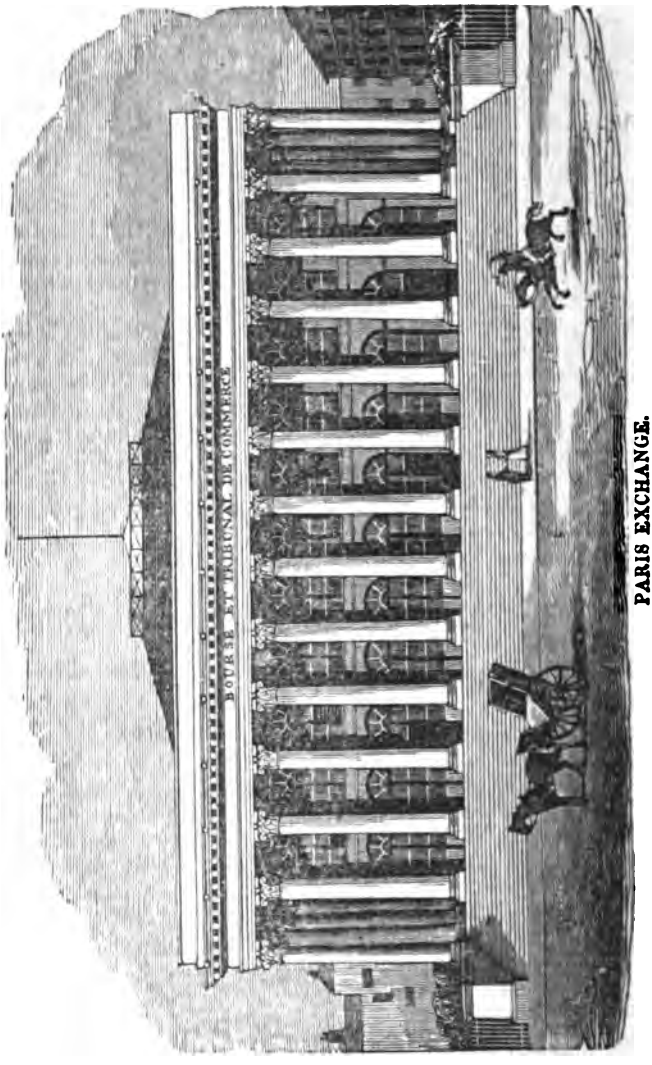
Amsterdam contains thirteen churches for the reformed religion, one English Presbyterian, one English Episcopal, one of the Remonstrants, three Lutheran, two Anabaptist, one of the United Brethren, sixteen Catholic, one Armenian, one Greek, five Jansenist, one Portuguese and one German Synagogue, in all forty-seven places of worship, or one for every 4255 persons. The number of charitable institutions is considerable.

This city has twelve public places, but not one of them is either large or magnificent: the *bogt* (bend) of the Heerengragt is a kind of circus which contains some of the best houses in Amsterdam. In the Dam we see the *Stadhuis*, or old town-hall of Amsterdam, built of Bremen and Bentheim stone, and said to rest on 13,659 piles of wood (Halma): it is 282 feet long, 235 feet deep, and 116 high, and crowned with a tower. The interior is adorned with a profusion of marble statues and pictures, which attest the splendor of the Amsterdam merchant, when he erected this edifice in 1648, during the glorious days of the republic. The marble hall is, perhaps, the finest room in Europe, being 120 feet long, 56 feet broad, and 98 feet high. Louis Bonaparte, who had a great liking for palaces, contrived to get possession of this when he was king of Holland, and the present royal family retain it as a palace. The *Beurs*, or exchange, is a large old building, with nothing remarkable except the concourse of merchants from all countries.

THE BOURSE—PARIS.

[See page 388.]

In 1724 the exchange of Paris was first established in the Hôtel Mazarin. It was not until the Emperor Napoleon directed his attention to the embellishment of the capital that it was resolved to erect a building to be specially devoted to the meetings of persons engaged in transactions relating to the public securities and to commerce. The first stone of the present edifice was laid March 24th, 1808; but it was eighteen years before it was completed, the work having been suspended in consequence of political events. The form of the Bourse is a parallelogram, that is, having a square form, the sides of which are longer than the ends. The fronts of the Bourse are 164 feet in breadth, and the length of the sides is 256 feet; and it is surrounded by sixty-four Corinthian columns. Each front is supported by fourteen columns, and each side by twenty,—reckoning the pillars at the angles twice over. They are elevated on a basement of about 8 feet in height, and in height are 32 feet. The colonnades are accessible to the public during the hours of business. The elevation terminates by a simple entablature. The roof is made of copper and iron. It is confessed that the Bourse has scarcely the air of an edifice devoted to commerce. It was erected during the most prosperous days of the empire; and the intention of the architect was to give to his design an imposing grandeur, and to produce a general effect, rather than to excite an appropriate idea of the objects of the building. The convenience of the apartments for the use of the



PARIS EXCHANGE.

commercial authorities has perhaps been slightly sacrificed; but undoubtedly the Bourse is one of the finest structures of which Paris can boast.

The hall in which the business in the funds is transacted is 104 feet in length, and 59 feet broad, and will hold 2000 persons. The floor is paved with marble; and at the upper end is a space, surrounded by a circular railing, termed the *parquet*, which is the place where the *agens de change*, or stock-brokers, assemble, who alone have the power of negotiating the public securities. An arcade on each side of the hall is used as a "walk" by merchants and ship-owners. A gallery of 10 feet wide extends round the hall, and a staircase on the left in the vestibule leads to it. From this gallery there is an excellent view of the proceedings of the speculators below. The rooms at the sides and at the lower end are appropriated to the Tribunal de Commerce, and other authorized commercial bodies. The interior of the hall, the roof of which slopes toward a skylight, is embellished with sixteen admirable imitations of marble bass-reliefs, five being on each side and three at each end. The subjects are as follow:—the Genius of French Commerce accepting tribute from the four quarters of the globe; Europe; Asia; the town of Nantes; that of Rouen: these are on the north side. In front of the public entrance is a representation of the King of France presenting the New Exchange to the city of Paris; the town of Lille; and the town of Bordeaux. On the right side: the union of Commerce and the Arts contributing to the prosperity of the State: Africa; America; Lyons; Bayonne. Above the entrance;—the City of Paris receiving from the Genius of the Seine and the Genius of the Ourcq the fruits of Abundance; Strasbourg and Marseilles. Between the arcades are inscribed, in letters of bronze, the names of all the first commercial cities in the world.

LONDON.

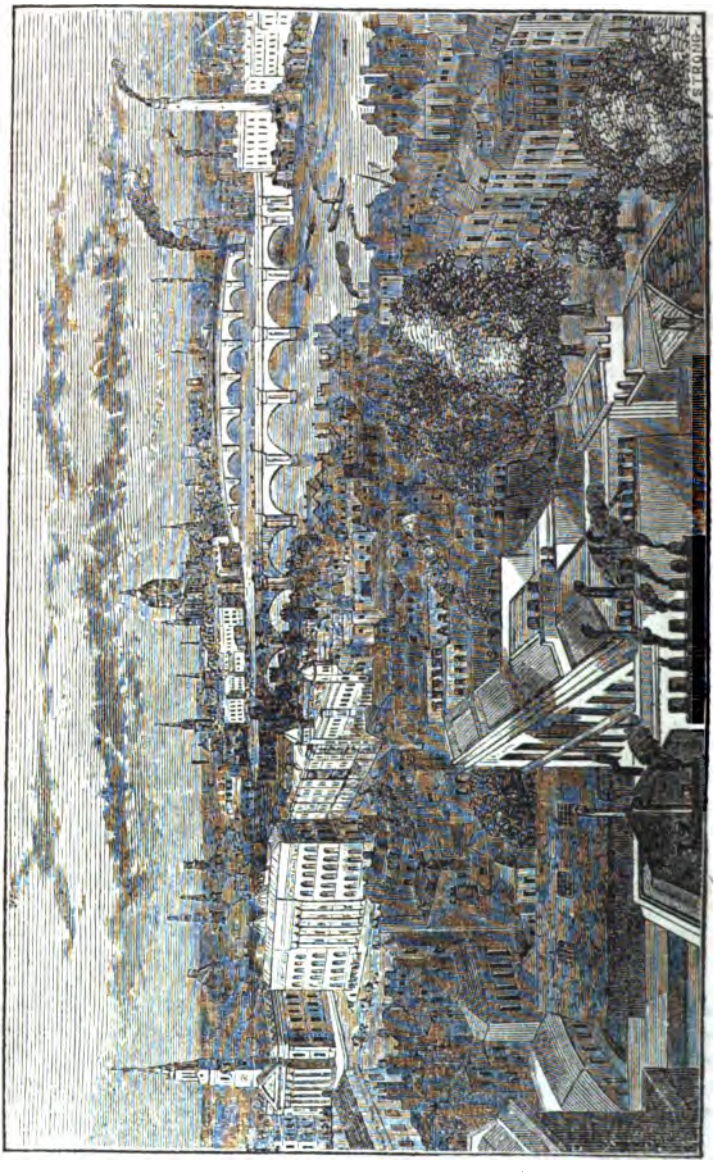
[See pages 390, 392, 393.]

LONDON, the metropolis of Great Britain, one of the largest and most opulent cities in the world, mentioned by Tacitus as a considerable commercial place in the reign of the Roman Emperor Nero. In its most extensive view, as the metropolis, it may be said to consist of five great portions, viz., the West End of the Town, the East End of the Town, Westminster See, and the Borough. The West End of the Town is popularly regarded as extending from Charing Cross to Hyde Park, and from St. James' Park to Paddington. This is the best and most fashionable portion of the metropolis, and is chiefly occupied by the town residences of the nobility and gentry, and fashionable shops.

The City includes the central part, and is the great emporium of commerce.

The East End of the Town is also devoted to commerce, ship building, manufactures, &c. The southern bank of the Thames, from Deptford to Lambeth, bears a great resemblance to the East End of the Town, being occupied by persons engaged in commercial and maritime concerns. London and Westminster are situated in Middlesex, on the north side of the river Thames. Southwark is situated on the opposite bank, in Surry.

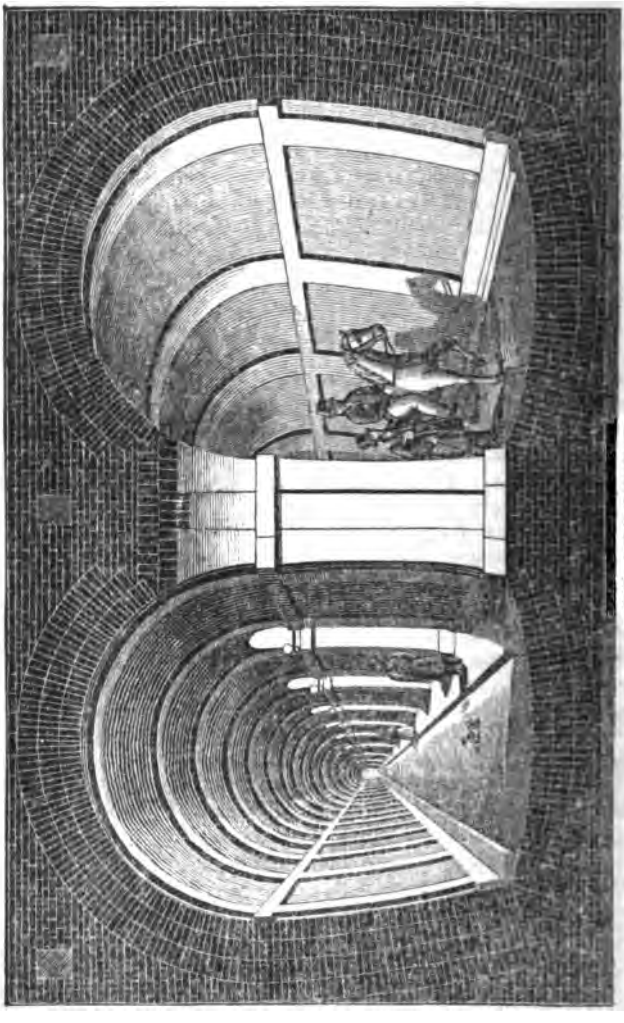
The extent of the whole, from Limehouse and Deptford, to Millbank and Vauxhall, is about 7 miles; and the breadth varies from 3 to 5. The extension of this metropolis, since the middle of the last century, has proceeded with unprecedented rapidity, and covered the fields, gardens, and marshes in the vicinity of London, with new squares and streets.



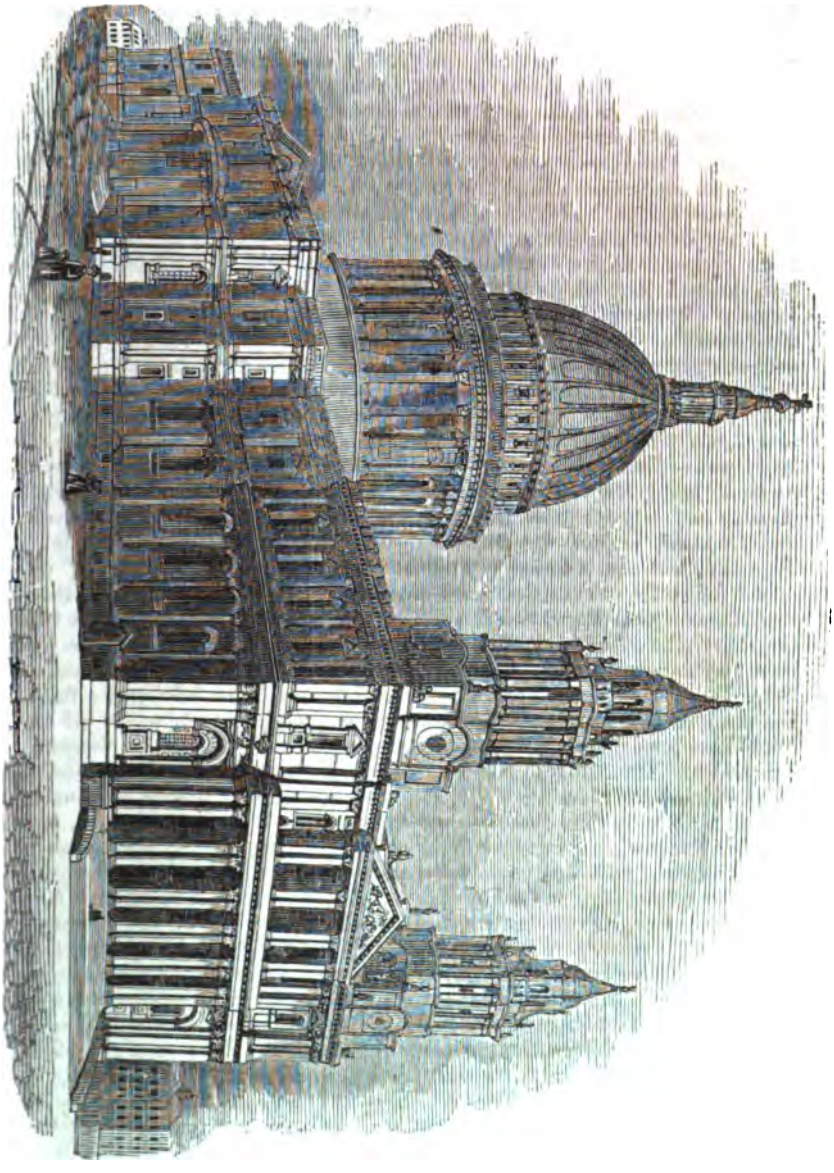
VIEW OF LONDON FROM THE YORK COLUMN.

The direction of the principal streets accompanies the course of the river Thames from east to west; and the cross streets run mostly in a transverse direction from north to south. There are two chief lines of streets from west to east; one of which commences at the north side of Hyde Park, and under the successive names of Oxford street, St. Giles', Holborn, Skinner street, Newgate street, Cheapside, Cornhill, and Leadenhall street, is continued to White Chapel and Mile End, on the Essex road; the other begins at the south side of Hyde Park, and consists of Piccadilly, St. James' street, Pall Mall, Charing Cross, the Strand, Fleet street, Ludgate Hill, St. Paul's Church-yard, Watling street, Cannon street, and Tower street; it may be said to be farther extended two miles along the river side, in Wapping. The streets near the river, and most of the cross ones in the city, are very narrow; the broadest and handsomest are to the north of Oxford street and Holborn. They are all well paved with granite stones, (for the attempts at Macadamizing have not succeeded in London,) and on each side with flag stones for the convenience of foot passengers. The subterranean works, constructed for the accommodation of the inhabitants, consisting of sewers, drains, water-pipes and gas-pipes, are most extensive. The houses are mostly built of brick, of a pale color. The principal squares are Grosvenor, Portman, Berkeley, St. James', Hanover, Manchester, Cavendish, Bedford, Russel, Tavistock, Bloomsbury, Montague, Leicester, Bryanston, and Finsbury squares, and Lincoln's Inn Fields. Among the public buildings, St. Paul's Cathedral is the most conspicuous. It is 2,292 feet in circumference, and 340 in height to the top of the cross, and is inferior to none in Europe, except St. Peter's, at Rome. It contains monuments of many illustrious individuals, who have done honor to their country by their talents or their virtues. Westminster Abbey is a grand specimen of Gothic architecture, said to have been founded by Sebert, king of the East Saxons, in 610. Here most of the English sovereigns have been crowned, and many of them interred. It contains, also, a great number of monuments, erected to the memory of kings, statesmen, heroes, poets, and persons distinguished by genius, learning, and science. The chapel of Henry VII., adjoining, Leland calls The Wonder of the World. St. Stephen's, Walbrook, is a small church, of exquisite beauty, the master-piece of Sir Christopher Wren. Bow Church, in Cheapside, St. Bride's, in Fleet street, St. Dunstan's, in the east, and several others, are worthy of notice; but the far greater number are of plain and ordinary architecture. The churches and chapels belonging to the establishment, in the bills of mortality, including those erected under the recent act of parliament, amount to 266. There are likewise a great number of meeting-houses for Protestant dissenters of all persuasions, 30 foreign Protestant churches, 15 Roman Catholic chapels, and 6 synagogues for the Jews. Besides the royal palaces, there are many fine houses of the princes of the blood, and of the nobility and gentry.

The Tower of London is very ancient, but the founder is uncertain. It is surrounded by a wall, and partly by a deep ditch. Here are the jewels and ornaments of the crown, as well as the other regalia, and the menagerie for foreign birds and beasts. The Mint, on Tower Hill, is a very elegant modern building, of pure Grecian architecture. The bridges are a great ornament to the metropolis. The most ancient, London bridge, was begun in 1176, and finished in 1209. The length of it was 915 feet. The number of arches 19, of unequal dimensions, through which, in consequence of their narrowness and clumsy construction, the current rushed with such force as to render the navigation extremely dangerous. This clumsy fabric has lately been removed, and its place supplied by the New London bridge, which was commenced March



THAMES TUNNEL.



ST. PAUL'S CATHEDRAL, LONDON.

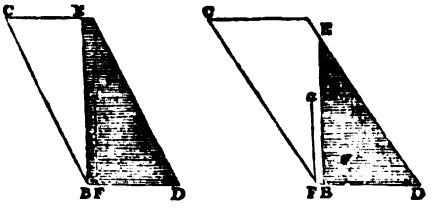
15, 1824, and completed July 31, 1831. This is one of the most splendid bridges in the world, being constructed of hewn stone, and unrivalled in the model and style of architecture. It consists of five semi-elliptical arches. Its length is 928 feet from the extremities of the abutments, and the width of the road-way, 53 feet. This bridge is 180 feet higher up the river than the old one, and is built of the finest granite. The quantity of stone used was about 120,000 tons. The expense of the construction was borne partly by the city of London, and partly by government; it being, like the old one, a free bridge. Westminster bridge was commenced in 1739, and opened to the public in 1750. It is 1223 feet in length, and has 13 large, and two small semicircular arches. Blackfriars bridge, built by Mylne, was completed in 1768. Its length is 995 feet; the breadth of the carriage way, 28; and of the foot paths, 7 feet each. It consists of 9 elliptical arches, the centre one of which is 100 feet wide; and both this and the arch on each side are wider than the celebrated Rialto, at Venice. Waterloo bridge, commenced in 1811, and opened in 1816, on the anniversary of the battle which it is designed to commemorate, is one of the noblest structures of the kind in the world. It consists of 9 arches, each 120 feet span, and is 35 feet elevation. The other bridges are those of Southwark and Vauxhall. The Thames Tunnel, a work so long regarded as impracticable, has at length completely reached across the river, a distance of 1200 feet. Among the other public buildings, which can merely be enumerated here, are Westminster Hall, containing the supreme courts of justice, and adjoining to which are the houses of lords and commons; the Guildhall of the city; the Sessions House; the Horse Guards; the Treasury, and the Admiralty, at Whitehall; the noble collection of public offices which form that magnificent structure called Somerset House; the British Museum; the Royal Exchange; the Bank of England; the Excise Office; the East India House; the Mansion House, for the Lord Mayor; the Monument in commemoration of the great fire, in 1666; the New Post Office, in St. Martin's-le-Grand, opened in September, 1829; the Stock Exchange; the New Custom House; the New Corn Exchange, erected on the site of the old one in Mark Lane, in 1829; the Herald's College, and the halls of the various city companies. The Adelphi Terrace is the admiration of foreigners, for the noble view which it affords of the river, the bridges, and other public buildings, and of the fine hills beyond Lambeth and Southwark. The inns of court, for the study of the law; the colleges, learned societies, and public seminaries; the noble hospitals, and other charitable institutions; the public places of diversion, &c., are too numerous to be here particularly mentioned. Such, on a cursory view of it, is the metropolis of Great Britain, to the extent and opulence of which many causes have contributed. The broad stream of the Thames, flowing between London and Southwark, continually agitated by a brisk current or a rapid tide, brings constant supplies of fresh air, which no buildings can intercept. The country around, especially on the London side, is nearly open to some distance; whence, by the action of the sun and wind on a gravelly soil, it is kept tolerably dry in all seasons, and affords no lodgement for stagnant air or water. The cleanliness of London, as well as its supply of water, is generally aided by its situation on the banks of the Thames; and the New River, with many good springs within the city itself, farther contributes to the abundance of that necessary element.

LEANING TOWERS.

[See pages 396, 398, 400.]

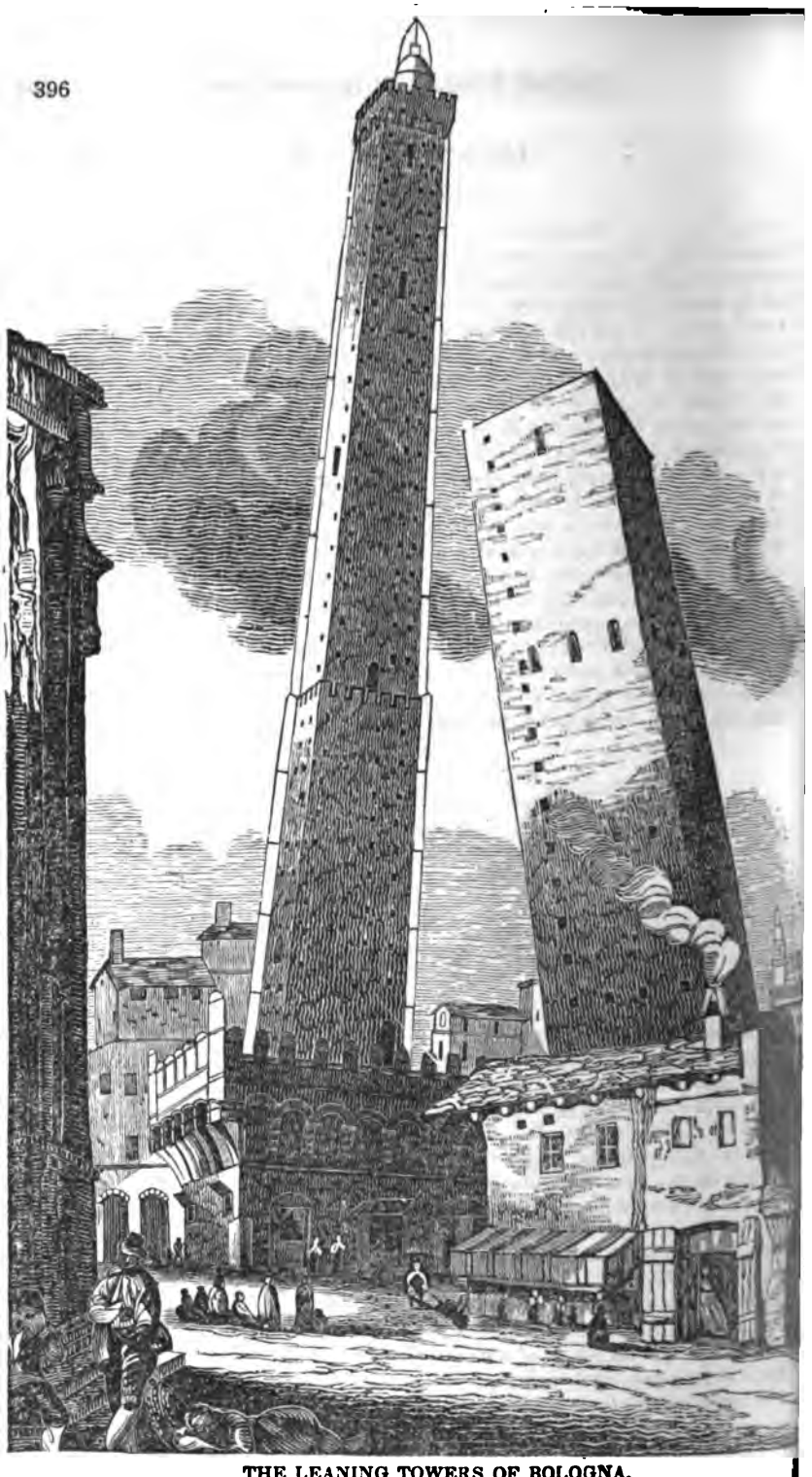
THE LEANING TOWERS OF BOLOGNA.—These curious specimens of architecture afford, perhaps, the most striking and remarkable examples in existence of that important principle of the laws of gravitation, "*that a body will be supported, or will stand, provided that its line of direction fall within its base*;" that is to say, in common phrase, provided it keeps its balance. It is almost superfluous to observe, that the converse of this principle is equally true, "*that a body will fall if its line of direction fall without its base*;" in other words, if it lose its balance. In order to understand the meaning and the reason of this, it will be necessary to remember, that the attraction of gravitation, or tendency to fall towards the centre of the earth, acts *equally on all parts* of the same body around which, in every direction, it acts equally. On this point the body may be said to be balanced; this is the centre of gravity, *a*, fig. 1; and a line drawn from it towards the centre of the earth, passing through the base, or lowest side of the body, is the line of direction *a* F, fig. 1; if, therefore, this line fall within the base, the centre of gravity is supported by the base, and the body is balanced, for the attraction of the dark part, B D E, which is supported by the base, has more tendency to keep the body standing, than that of the light part B C E, which is unsupported by the base, has to incline, or pull it down; but if, as in fig. 2, the line of direction fall without the base, where *a* is the centre of gravity, and *a* F the line of direction, it is clear that there being more parts of the body unsupported by the base than

Fig. 1. *Fig.* 2.



those which are supported, or B C E being larger than B D E, the attraction of the greater part will overcome that of the lesser, and that the body will not be balanced, but have a greater tendency to fall than to stand. Perhaps the following explanation may make this important rule more intelligible. The power of all the forces of the attraction of gravitation acting on *different parts* of a body, is exactly equal to that of *one* force acting on the centre of gravity *only*. If, therefore, this point be supported, the whole body will be supported, and this can only be the case when the line of direction falls within the base.

It has been found by experiment, that most lofty buildings of any antiquity are slightly inclined from the perpendicular; the Monument near London Bridge is one of many instances; but the Towers at Bologna and Pisa in Italy, and at Caerphilly, Bridgenorth, and Corfe Castle, in England, are the most remarkable. We are indebted to that elegant periodical work, the *Landscape Annual*, for a beautiful view of those at Bologna. They were probably erected by private families, for the purposes of defence in the desperate feuds and civil wars which so long desolated Italy, and rendered buildings such as these of the utmost importance to their possessors. The small republics of Lombardy were

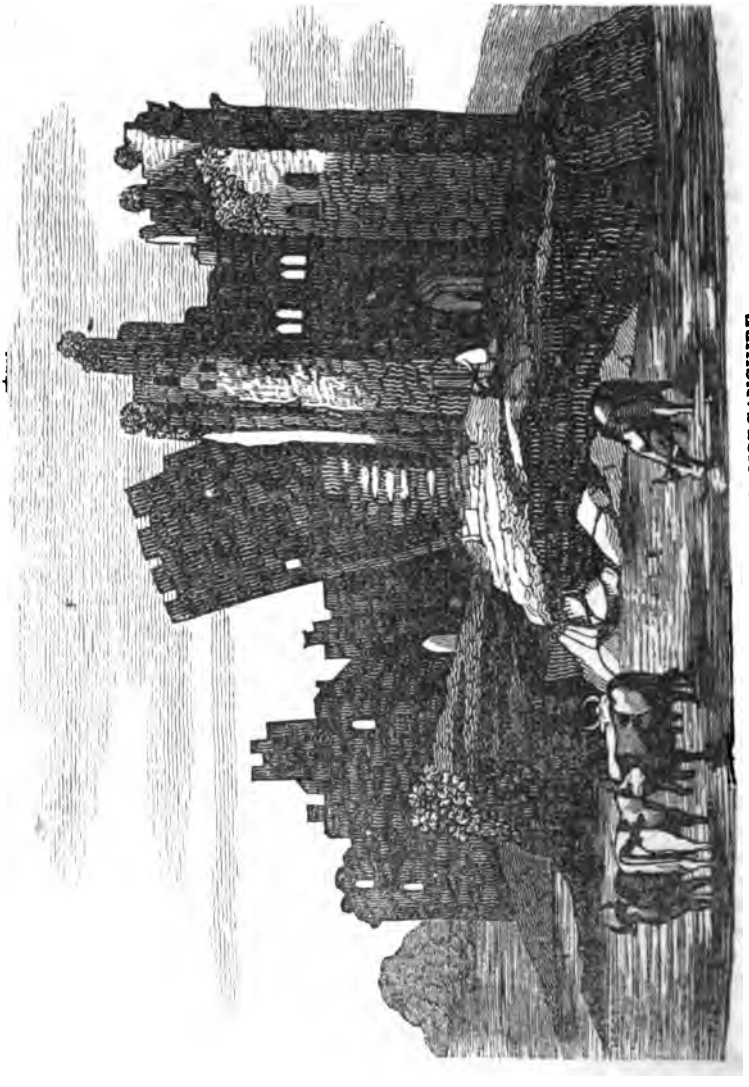


THE LEANING TOWERS OF BOLOGNA.

continually at war with each other, or with the Emperors of Germany; every city was divided into the two furious factions of Guelfs and Ghibellines, (or the parties of the Pope and the Emperor;) and every street (frequently every family) was "divided against itself" by the quarrels of the nobles,—the Montagues and Capulets of their day;—and every man's house was indeed his castle, but in a very different sense from that which these words now convey to English ears. The taller of the two, that of the Asinelli, was built A. D. 1109; its height has been variously stated at 350, 377, and 307 feet, and its inclination at a few inches, and at 3 feet and a half. It has no external beauty, but rewards the traveller for a tedious ascent of 500 steps, by an extensive view, which includes the neighboring cities of Imola, Ferrara, and Modena. The tower of the Garisendi or Garissuidi, is immortalized by Dante's simile, who compares it to the stooping Giant Antæus; its height is 140 or 150 feet, and it deviates 7 or 8 feet from the perpendicular. The woodwork and masonry incline from the horizon, which fact strongly corroborates the opinion of Montfaucon, the Antiquary, of the correctness of which there can hardly be a doubt; he says its inclination was "caused by the slipping of the earth; some went to ruin when it slipped, as the ground on the inclined side was not so firm, as may be said of the other towers that lean; that for the bells of St. Mary Zibenica, at Venice, leans; and at Ravenna, and between Ferrara and Venice, and in other places, numerous instances may be found." Of the leaning towers of Italy, this tower is second only to that of Pisa, in the greatness of its deviation from the perpendicular, but is inferior in this point to that of Caerphilly Castle, whilst in height the tower of Asinelli soars far above its competitors in Italy and England.

Caerphilly Castle, Glamorganshire.—The most remarkable leaning tower in Great Britain is that of Caerphilly Castle, in Glamorganshire; indeed, in proportion to its height, it is much more inclined from the perpendicular than any other in the world of which we can find an account, for it is between 70 and 80 feet high, and 11 feet out of the perpendicular. It rests only on part of its south side, principally by the strength of its cement, the manner of making which is unknown to modern masons, except to a partial extent. The singularity of its position is best observed by looking at it from the inside, or from the moat immediately underneath it, from whence the effect of the apparently falling mass is most extraordinary. The castle, of which this tower forms a part, was built about A. D. 1221; that which previously stood on the same spot having been razed to the ground by the Welsh, in an attempt to free themselves from the yoke of their Norman Conquerors. It is inferior in extent only to Windsor Castle, and must have been one of the most magnificent in the kingdom, its various outbuildings and fortifications covering nearly eleven acres; it is situated on a small plain, bounded by rising ground of very moderate elevation, about nine miles north of Cardiff. It is still a noble ruin, and the great hall is particularly worthy of notice. The fine form of its Gothic windows, and the clustered flying pillars which project from different sides of the room, and from which spring the vaulted arches of the roof, give an uncommon charm to the lightness of its proportions.

The cause of the inclination of the tower alluded to is not a little singular. The unfortunate King Edward the Second, and his favorites the Spencers, were here besieged by the forces of the Queen and many powerful barons in 1326. The defence was long and bravely conducted, and the besiegers were particularly annoyed by metal in a melted state being thrown down on them,



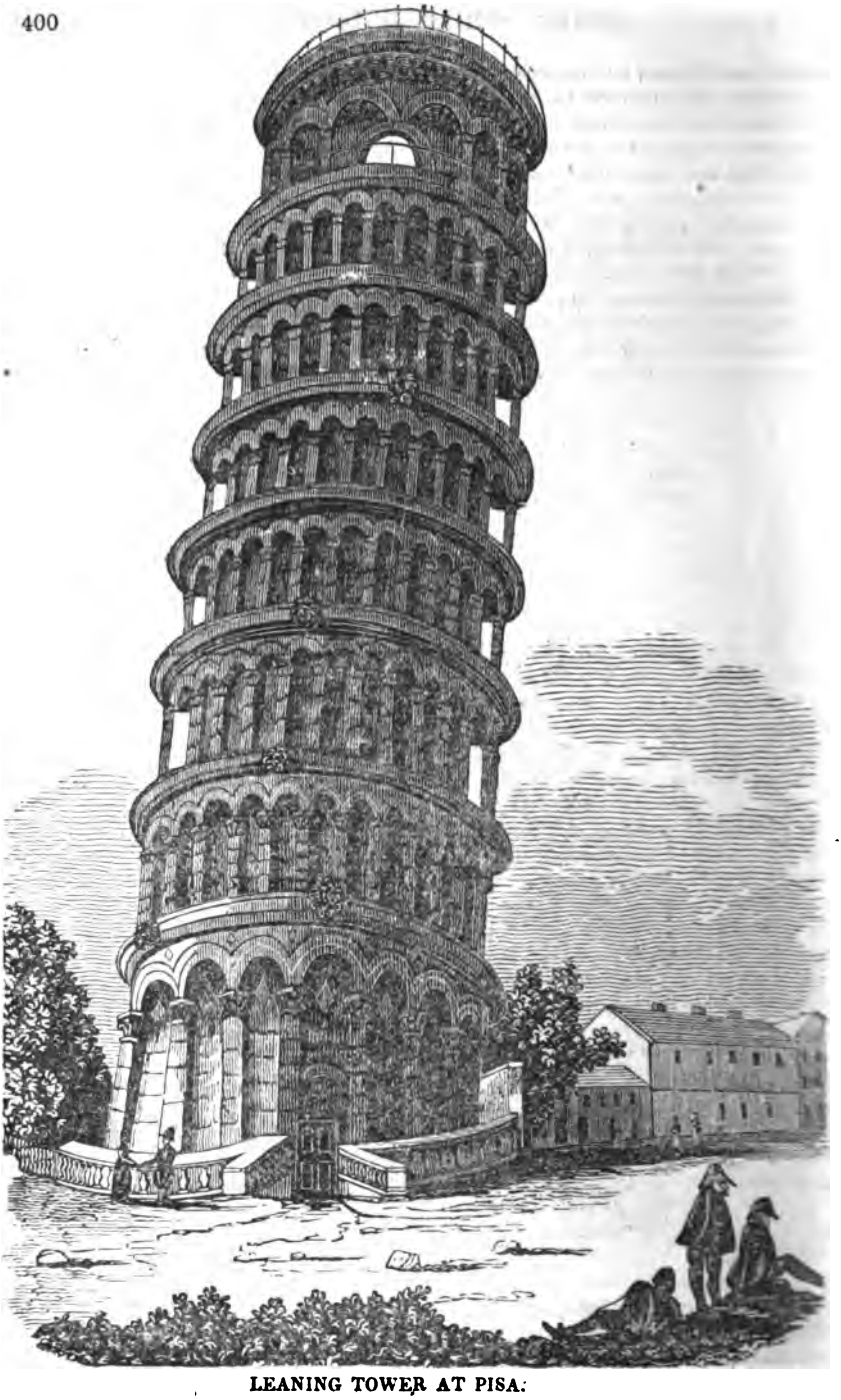
CAERPHILLY CASTLE, GLAMORGANSHIRE.

which was heated in furnaces still remaining at the foot of the tower, and during their partial success in a desperate assault, (which ultimately failed,) they let the metal, which was red hot, run out of the furnaces, and, either from ignorance or design, threw water from the moat on it, which caused a violent explosion, tore the tower from its foundations, and hurled it into its present position. The solidity of its wall is amazing, and it has resisted the ravages of time in a remarkable manner, the only rents now visible having been caused by the explosion; the storms of more than five hundred years have scarcely displaced a stone from the summit, and the whole surface is almost without a flaw.

The castle at length surrendered, the king, whose tragical end is familiar to all, having previously escaped. The Spencers were beheaded at Bristol, and their castle never regained its ancient splendor. It had long been the dread of the neighboring Welsh, to restrain whose frequent risings it was built; a song-ballad of their Bards is yet preserved, in which he prays that his enemy's "soul may go to Caerphilly;" and "going to Caerphilly," in a similar sense, was by no means an uncommon phrase in that country.

Bridgenorth Castle, Shropshire.

Bridgenorth Castle, Shropshire.—The leaning towers at Bridgenorth Castle in Shropshire, and at Corfe Castle in Dorsetshire, are both much inferior to that at Caerphilly. They were placed in their present position by the use of gunpowder in the civil war which unhappily raged between King Charles



LEANING TOWER AT PISA.

and his Parliament. Whether they were mined or battered is not certain. Corfe Castle was bravely defended for some time by Lady Banks, who, although her husband, the Chief Justice of England, was absent, compelled the troops of the Parliament to raise the siege; who were thus, in the words of one of our best modern poets, alluding to the defence of Saragossa,

"Foil'd by a woman's hand before a shatter'd wall."

The present state of these towers is not without its moral; for, in recalling to our thoughts times happily for us gone by, when the fury of faction and the violence of civil war rent the kingdom to its foundation, disfiguring and distorting what they yet failed to destroy, we may look upon such ruins at once as monuments of the past, and as warnings for the future.

The Leaning Tower at Pisa.—The height of this remarkable tower is about 187 feet; it is ascended by 355 steps, and contains seven bells. It stands alone, unconnected with the neighboring buildings, and was probably intended as an ornamental belfry. It is inclined from the perpendicular rather more than fourteen feet. It is built of marble and granite, and has eight stories, formed of arches supported by 207 pillars, and divided by cornices. Its form and proportions are graceful, and its whole appearance, from a short distance, is remarkably beautiful. Whilst approaching the city (which is situated on an extensive plain) at the distance of a few miles, the effect, when the tower is seen over the tops of the trees, between two others which are perpendicular, is so striking, that the spectator feels almost inclined to doubt the evidence of his senses. It was erected about A. D. 1174, by Wilhelmus, or William, a German architect, assisted by two Pisans. From the inclination of the stairs, it seems to a person going up or down hastily to roll like a ship. This beautiful structure, notwithstanding its inclination, seems to have withstood the ravages of time with more than usual success, as it has now stood for more than 600 years, without any fissure, or the slightest perceptible sign of decay. Travellers, antiquaries, and the learned in general, have been perplexed and divided in opinion with respect to the cause of the inclination: some have argued in favor of its being accidental; others have merely stated the different opinions on the subject, without giving their own; whilst Dr. Arnott, in his popular work "on the Elements of Physics," distinctly says that it was built *intentionally* inclined, to frighten or surprise.

It has remained for the accurate observation of an English lady, who travelled in Italy a few years ago, to set the question at rest by discovering what had escaped the notice of so many learned gentlemen. "In that part of the Campo Santo," says Mrs. Stark, "in which the life of St. Ranieri is painted, we see the now leaning tower *upright*." These paintings are supposed to have been done about A. D. 1300, more than one hundred years after the tower was erected; so that it may now be considered as certain, that the inclination was caused by the gradual sinking of the earth, as in all the other instances in Italy. This opinion is confirmed by the circumstances of the lowest row of pillars being sunk deep in the earth, the mouldings not running parallel with the horizon, and the inclination of the stairs. Very accurate models of this tower are frequently beautifully made in alabaster and marble. With these observations we conclude the subject of Leaning Towers.

ARCHITECTURAL MONUMENTS.

[See pages 403, 405, 407.]

TEMPLE OF SEGESTA.—Twelve leagues west of Palermo, at some distance from the sea, in a barren and truly desolate country, the traveller will observe, at the base of a narrow gorge, numerous blocks of stone, where he can still discern traces of human art, but which give no intimation as to what might have been their former destination. One ruin, however, is sufficiently perfect to authorize the opinion, that it belonged to the theatre. These ruins, which are now vaguely termed *Barbara*, are all that remain of one of the most powerful cities of Sicily. Founded by the companions of Æneas, and perpetuating the memory of its Trojan origin by the names of Scamander and Simois, given to the two rivers which bathe it with their waters, Segesta, sometimes termed Ægesta, in the early periods of the Roman era, rivalled even Syracuse in grandeur. About three hundred years before the Christian era, Agathocles, tyrant of Syracuse, to punish Segesta for taking part with the Carthaginians against him, destroyed it: the walls were overthrown, the inhabitants were massacred, and, to perpetuate the memory of this horrid event, the term, "CITY OF VENGEANCE," was applied to the ruins. The Segestians, however, had so many resources, that they soon effaced all traces of this calamity, a new city sprung up, and resumed its rank among the capitals of Italy.

After many centuries of prosperity, the Segestians were committed to the fire and sword by the Saracens, and this time the injury was irreparable, for Italy was now exhausted. But, by a singular contrast, near these ruins rises the most imposing, the most ancient, and the best-preserved monument of Sicily.

On approaching the ruins of Segesta from the sea, the eye is fatigued by the barren rocks, and the absence of all picturesque beauty in the landscape. We look in vain for any traces of a habitation, when suddenly, on the summit of a far-distant hill, a majestic colonnade is observed. This building stands above Segesta, on a promontory; its form is that of a regular parallelogram, one hundred and seventy-five feet long by seventy-three feet broad; it is composed of thirty-six columns, twelve of which are placed on each of the two longest faces, and six on each of the extremities. These columns are of the Doric order, and gradually diminish towards the top; they are twenty-eight feet high and six feet in diameter; they support an entablature about eight feet high, which is ornamented by a very prominent cornice. At the two extremities, the monument presents a front, the angles of which are very obtuse, and there is no reason to think that the space existing between the columns was ever closed, or that there was ever any interior within the colonnade: places for the cornices of the roof, however, still exist, but of this, as well as of the pavement, there are now no traces. The material used in the construction of this building is common limestone, which is incrusted with shells; but its tint is a bright yellow, and it is interspersed with veins, so that when seen from a distance, the columns appear to be formed of marble. Its state of preservation is extraordinary; the sharp edges of the stones are yet firm.

At the end of the last century, the lovers of antiquity were fearful lest the symptoms of decay then presented by this building, should rob them of this magnificent monument of architecture; but, happily, remedies were applied in time, and this noble specimen of art was preserved without being disfigured by modern repairs.

More perfect than most of the other monuments of Sicily, the beautiful ruin of Segesta seems to be of a more recent date; but it is more ancient than any

TEMPLE OF SECRETA.

others. When we compare it with other ruins, we find that the architecture of it is different from all of them; it belongs neither to the Greek nor Roman school; and hence, we must look for its origin to the earliest periods, and believe that this noble edifice was built by the descendants of the companions of Æneas, and that it is therefore three thousand years old. It was doubtless a religious edifice, but whether consecrated to Venus, Ceres, or Diana, it is impossible to say; and the monument is therefore simply termed the "Temple of Segesta."

The Temple of Concord is one of the most perfect ruins now existing on the site of the ancient Agrigentum.

Agrigentum was much renowned among the ancients. Different stories are told of its foundation; among which is the fabulous tale, that Dædalus, who fled to Sicily from the resentment of Minos, erected it. Its situation was peculiarly strong and imposing, standing as it did on a bare and precipitous rock, 1100 feet above the level of the sea. To this military advantage, the city added those of a commercial nature, being near to the sea, which afforded the means of an easy intercourse with the ports of Africa and the south of Europe. The soil of Agrigentum was very fertile. By means of these advantages, the wealth of Agrigentum became very great. It was therefore considered the second city in Sicily, and Polybius says that it surpassed, in grandeur of appearance, on account of its many temples and splendid public buildings, most of its contemporaries. Among the most magnificent of these buildings, were the temples of Minerva, of Jupiter Atabyris, of Hercules, and of Jupiter Olympius; the latter, which vied in size and grandeur of design with the finest buildings of Greece, is said by Diodorus to have been three hundred and forty feet long, sixty broad, and one hundred and twenty high, the foundation not being included, which was itself remarkable for the immense arches upon which it stood. The temple was ornamented with admirable sculpture. But a war prevented the completion of it, when the roof only remained unfinished. Near the city was an artificial lake, cut out of the solid rock, about a mile in circuit, and thirty feet deep; from which fish was obtained in abundance for the public feasts. Swans and other water-fowl frequented it. Afterward, the mud having been suffered to accumulate in this basin, it was turned into a remarkably fruitful vineyard. Both the temple of Jupiter Olympius and the lake were the work of a number of Carthaginian captives. The people of Agrigentum were noted for their luxurious and extravagant habits. Their horses were also famous. After the expulsion of the Carthaginians from Sicily, it fell, with little resistance, under the power of the Romans. Diodorus states the population, in its best days, to have been not less than 120,000 persons.

Temple of Schoe-Madou, at Pegu.—Pegu, the former capital of the kingdom of that name, was formerly a large and magnificent city: in 1757, however, it was attacked by the Burmese conqueror, Alompra, who destroyed it, dispersed a portion of its inhabitants, and led the others away captive. The numerous temples of Pegu, were the only buildings which were left; although the city was rebuilt in 1790, all these edifices were neglected, except the great temple of Schoe-Madou or the god of gold, undoubtedly one of the loftiest and most remarkable buildings in Asia, curious from the character of its architec-

Temple of Canonsol.

savages. Fortunately, they had been joined by an old planter, who knew enough of the Indian tongue and disposition to persuade the chiefs not to attack the party till morning. At daybreak, some of the savages made their appearance, but stood awhile at a distance. At last one of them held out a bass, and the pilgrims sent a man with a biscuit to exchange for it, and thus a friendly intercourse was established. Not liking the neighborhood, however, they descended the river again, and an exploring party having discovered some good pasture at Mattapau, (present Dorchester,) they settled there.

The neighboring peninsula of Shawmut (now Boston) was destined to be the principal settlement, and Dorchester is at this day a rural suburb of the capital of New England. The fort which crowns its summit (from which our view is taken) is the scene of an important chapter in the history of the Revolution.

Boston had been occupied for some time by the British army under General Gage, who sailed for England in October, 1776, leaving General Howe in command. After the battle of Bunker's Hill, both armies remained quiet for several months; General Washington occupying both sides of the Charles river with about fourteen thousand men; and the English besieged in their quarters within the town, amusing themselves with private theatricals in Faneuil Hall, varied occasionally with feats of horsemanship from a squadron of cavalry, who had turned the old South Church into a circus. As the cold became severe, the North "meeting-house," an immense wooden building, was torn down and consumed for fuel, and the soldiers had made a holyday of felling a gigantic liberty-tree for the same purpose.

Washington became impatient of this inactive situation; and as soon as the ice in the bay and river became firm enough to allow the passage of troops, he called a council of war, and proposed an attack on Boston. The opinion against the measure was unanimous, and he reluctantly abandoned it. He soon after determined to take possession of Dorchester Heights, which command both harbor and town—a step which he knew must bring on a general action, during which he intended to cross over to Cambridge with a few chosen men, and force an entrance into the town. During the two or three preceding nights, he bombarded the town heavily from his camp, to divert the attention of the garrison; and on the night of the fourth of March, a large detachment took possession of Dorchester Heights, and immediately commenced throwing up an intrenchment. The night was mild, but the ground was frozen almost impenetrably hard; and it was with excessive labor that a sufficient bulwark was presented by daylight, to cover them from the shot of the enemy.

The morning broke—and a thin haze, which magnified the size of the works, overspread the landscape. The astonishment of General Howe, at discerning this phantom fortification looming up through the mist, upon heights which had been bare and desolate at sunset, was without bounds. The position was so commanding, that the town could not be held unless the Americans were dislodged; but this seemed, from the advantages of the ground in favor of the Provincials, next to impossible. The British commander undertook it with great spirit, and two thousand troops were embarked on the same day to cross the harbor to the attack. The transports fell down to the Castle, a small island just below the town; but a tremendous storm suspended their operations. The next day a council of war was held, and it was thought advisable to evacuate the town immediately. The provincials went on completing their fortifications, undisturbed; and in a few days General Howe embarked with all his forces, accompanied by those Americans who adhered to the royal cause. The embarkation commenced at four in the morning of the 17th of March, and at ten in the forenoon General Washington entered the city at the head of his

army. The English fleet sailed for Halifax. They were ten thousand strong, including the marines; and left stores to the value of £30,000, with several pieces of cannon, mortars, &c. &c.

The view of Boston from these heights is very commanding. The bay, with its fortified islands, stretches away to the right, beautiful from its shape and from the brightness of its water; the city, clustering upon its heights, rises in graceful lines to the pinnacled State House; and the country to the left is all that is lovely in cultivation, sprinkled here and there with gay and thrifty-looking villages. The calenture of speculation has reached its height in America; and Dorchester, like other places, is laid out in lots, and busy with the builders of fancy cottages and hotels. If calculation has not overreached itself, the suburbs of Boston will soon sparkle with villas on every hillside within the horizon.

MASSACHUSETTS GENERAL HOSPITAL, BOSTON.

[See page 411.]

This has been pronounced the finest building in the State. It stands on a small eminence open to the south, east, and west. It is one hundred and sixty-eight feet in length, and fifty-four in its greatest breadth, having a portico of eight Ionic columns in front. It is built of Chelmsford granite, the columns and their capitals being of the same material. In the centre of the two principal stories are the rooms of the officers of the institution. Above these is the operating theatre, which is lighted from the dome. The wings of the building are divided into wards and sick-rooms. The staircase and floorings of the entries are of stone. The whole house is supplied with heat by air-flues from furnaces, and with water by pipes and a forcing-pump. The beautiful hills which surround Boston are seen from every part of the building, and the grounds on the southwest are washed by the waters of the bay. The premises have been improved by the planting of ornamental trees and shrubs, and the extension of the gravel walks for those patients whose health will admit of exercise in the open air.

Toward the close of the last century, a gentleman died in Boston, leaving a bequest in his will of five thousand dollars toward the building of an hospital. This circumstance was attended with the beneficial effect of awakening the attention of the public to the subject. Nothing, however, was effected before August, 1810, when two physicians living in Boston addressed a circular, in which the advantages of an hospital were stated, to several gentlemen of Boston, possessed of ample fortunes, and disposed to contribute to institutions in which the public good was concerned. In the beginning of 1811, fifty-six gentlemen, living in different parts of the commonwealth, were incorporated by the name of the Massachusetts General Hospital. Their charter allowed the corporation to hold property to the amount of thirty thousand dollars yearly income. It also granted to the Hospital a fee-simple in the estate of the old Province-House, on the condition that one hundred thousand dollars should be raised by subscription within ten years. Little exertion was made before the autumn of 1816, when a subscription was commenced that was attended with uncommon success. In the towns of Boston, Salem, Plymouth, Charlestown, Hingham, and Chelsea, (including a few subscriptions in some other towns,) 1047 individuals subscribed either to the Hospital or the Asylum for the insane. More than two hundred of these contributed one hundred dollars or more, and several from one

MASSACHUSETTS GENERAL HOSPITAL, BOSTON.

thousand to five thousand, and one, twenty thousand dollars. Donations of equal and larger amounts have since been made, which have increased the funds of this institution, for immediate use and permanent stock, to a greater sum than any other of our institutions has realized, excepting the University at Cambridge.

In 1816 the Trustees purchased the estate at Charlestown belonging to the late Mr. Barrel, formerly called Poplar Grove, and have there built two brick houses, besides the requisite out-houses, for an Insane Hospital. In 1817, they purchased four acres in a field at the west end of Boston, called Prince's Pasture, and on the fourth day of July, 1818, the corner stone of the present Hospital was there laid, in the presence of many persons of great dignity in public life, and a numerous assemblage of citizens. The civil, religious, and masonic services were performed with such impressive pomp, as rendered the whole scene truly solemn and interesting. This building was so far completed on the first of September, 1821, as to be in a fit condition to receive patients.

FANEUIL HALL, BOSTON.

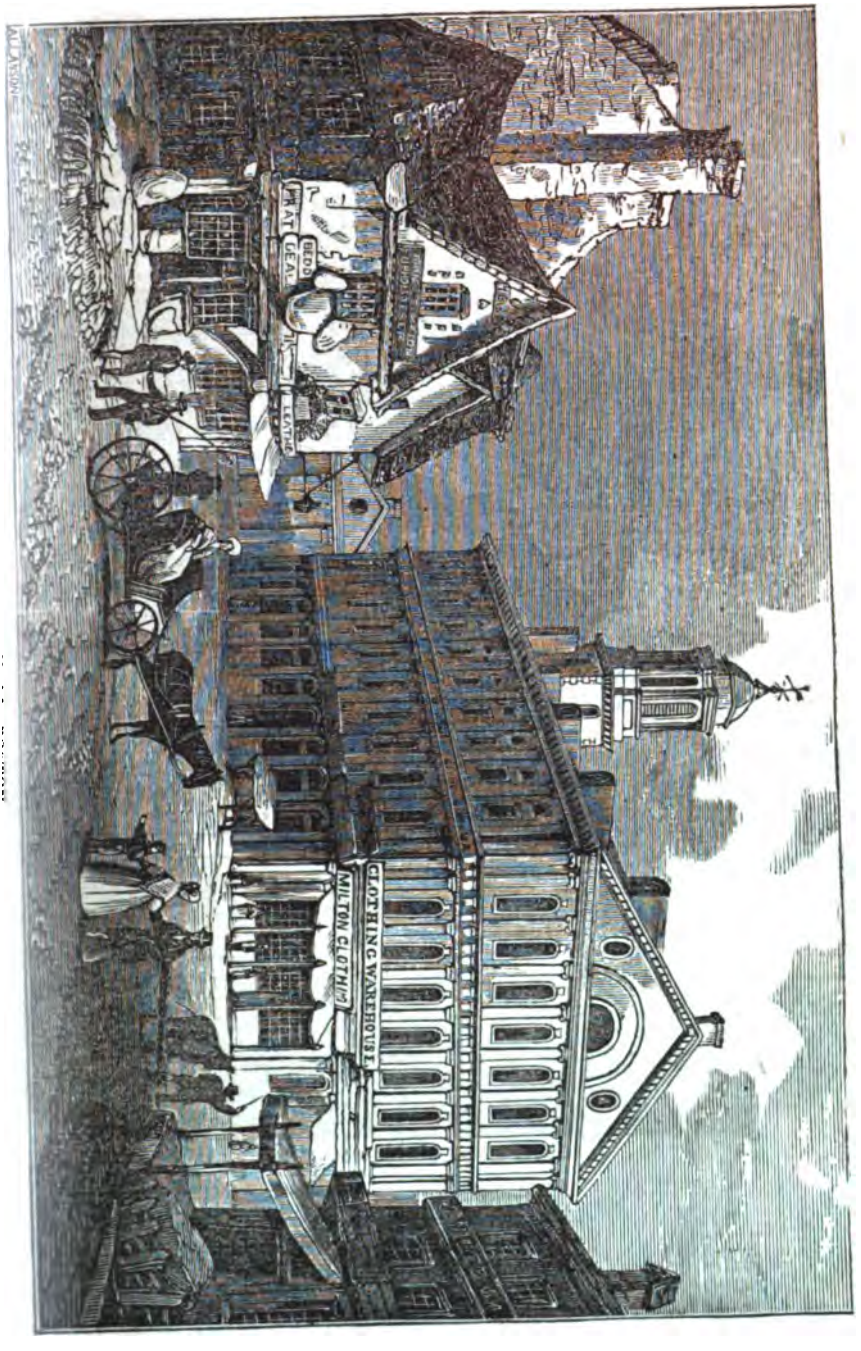
[See page 413.]

Faneuil Hall was erected in 1742, at the sole expense of Peter Faneuil, Esq., and generously given to the town; the basement for a market, with a spacious and most beautiful hall, and other convenient rooms above, for the accommodation of the citizens on all public occasions. The building was then one hundred feet by forty; and the hall capable of holding two thousand people, or more. This fine and convenient building was consumed by fire in 1761, excepting the brick walls: but the town voted to rebuild it immediately. Mr. Faneuil had then been dead several years. In 1805, it was enlarged by the addition of another story, and of forty feet to the width, thus making it eighty feet wide. There is a cupola on the building, from which is a fine view of the harbor of Boston. The hall is about eighty feet square, and twenty-eight feet in height; with galleries on three sides supported by Doric columns. At the west end, the wall is ornamented with a good full-length likeness of Peter Faneuil, of General Washington, Governor John Hancock, General Henry Knox, and others; and a bust of President John Adams. The lower part of the building is no longer used as a market; a large and elegant one having been erected by the city for that purpose in 1827. In the immediate vicinity stands one of those old, antiquated, "many-covered, gable-ended, top-heavy" old houses which constituted the compact centre of Boston in the days of the old English governors.

THE CAPITOL OF MASSACHUSETTS.

[See page 414.]

This elegant and spacious edifice, situated in Boston, on elevated ground adjoining the Common, and near the centre of this ancient and flourishing city, was erected in 1795. The corner-stone was laid on the Fourth of July, by the venerable and patriotic Samuel Adams, then Chief Magistrate of Massachusetts, (assisted by Paul Revere, Master of the Grand Lodge of Masons.) He succeeded Gov. Hancock, who died in October, 1793.


MILTON CLOTHING
CLOTHING WAREHOUSE

CAPITOL OF MASSACHUSETTS.

The lot was purchased by the town of Boston of the heirs of Gov. Hancock, at four thousand dollars. The building was not finished and occupied by the Legislature till January, 1798; when the members of the General Court walked in procession from the Old State House at the head of State street, and the new edifice was dedicated by solemn prayer to Almighty God. The Old State House, so called from the time of building the other, was long the place in which the General Court of the province of Massachusetts was holden.

The corner-stone of the present capitol was brought to the spot by fifteen white horses, at that time the number of States in the Union. The building is seen at a great distance in all directions, and is the principal object visible when the city is first seen by those who visit it. The form is oblong, being one hundred and seventy-three feet in front, and sixty-one feet deep. The height of the building, including the dome, is one hundred and ten feet; and the foundation is about that height above the level of the water of the bay. "It consists externally of a basement story, twenty feet high, and a principal story, thirty feet high. This, in the centre of the front, is covered with an *attic* sixty feet wide and twenty feet high, which is covered with a pediment. Immediately above arises the *dome*, fifty feet in diameter, and thirty feet in height; the whole terminating with an elegant circular lantern, which supports a pine cone. The basement story is finished in a plain style on the wings, with square windows. The centre is ninety-four feet in length, and formed of arches which project fourteen feet, and make a covered walk below, and support a colonnade of Corinthian columns of the same extent above.

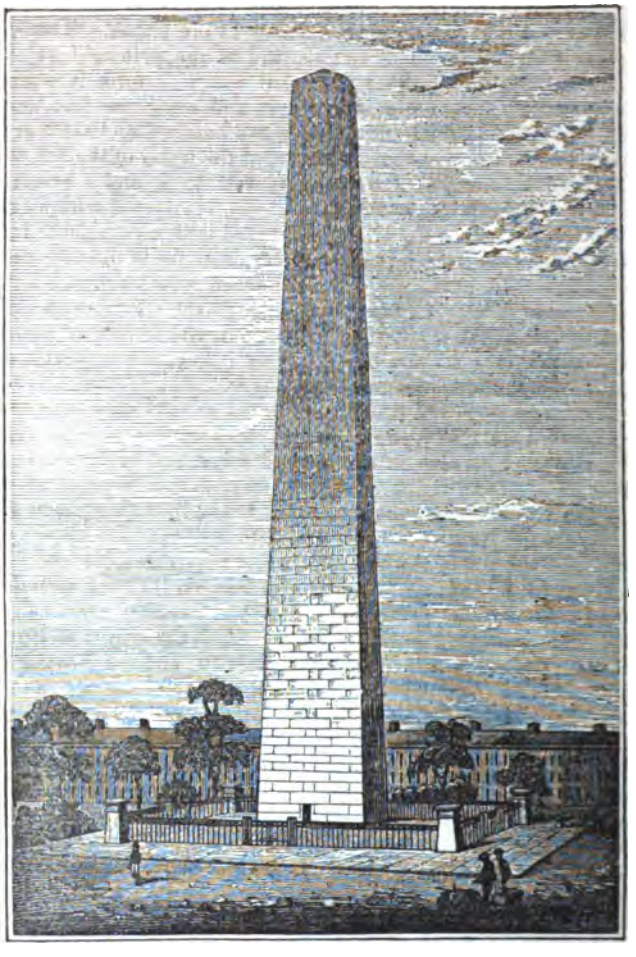
The largest room is in the centre, and in the second story, and is occupied as the Representatives' Chamber: it will accommodate five hundred members. The Senate Chamber is also in the second story, and at the east end of the building, being sixty feet by fifty. On the west end is a large room for the meetings of the Governor and the Executive Council, with a convenient antechamber.

The view from the top of the State House is very extensive and variegated; perhaps nothing in the country is superior to it. To the east appears the bay and harbor of Boston, interspersed with beautiful islands; and in the distance beyond, the wide extended ocean. To the north the eye is met by Charlestown, with its interesting and memorable heights, and the Navy Yard of the United States; the towns of Chelsea, Malden, and Medford, and other villages, and the natural forests, mingling in the distant horizon. To the west is a fine view of the Charles river and bay, the ancient town of Cambridge, rendered venerable for the University, now two centuries old; of the flourishing villages of Cambridgeport and East Cambridge, in the latter of which is a large glass-manufacturing establishment; of the highly-cultivated towns of Brighton, Brookline, and Newton; and to the south is Roxbury, which seems to be only a continuation of Boston; Dorchester, a fine, rich agricultural town, with Milton and Quincy beyond; and still farther south, the Blue Hills, at the distance of eight or ten miles, which seem to bound the prospect.

BUNKER'S HILL MONUMENT.

[See page 416.]

On another page is a representation of the Monument now completed at Charlestown, Mass., in commemoration of a battle, upon its very grounds, the most bloody in its details, and perhaps the most important in its consequences, of



BUNKER'S HILL MONUMENT, CHARLESTOWN, MASS.

any that took place during the Revolution. The battle was fought on the 17th day of June, 1775. Just fifty years after, viz., on the 17th of June, 1825, the corner stone of this *Obelisk* was laid, in the presence of the illustrious Lafayette, and an immense concourse of spectators who had assembled from all quarters to witness the interesting ceremonies. The foundation, 50 feet in diameter, was found insufficiently deep to resist the effects of the frost, and was therefore taken up, sunk, and relaid again on the 21st of July, 1827.

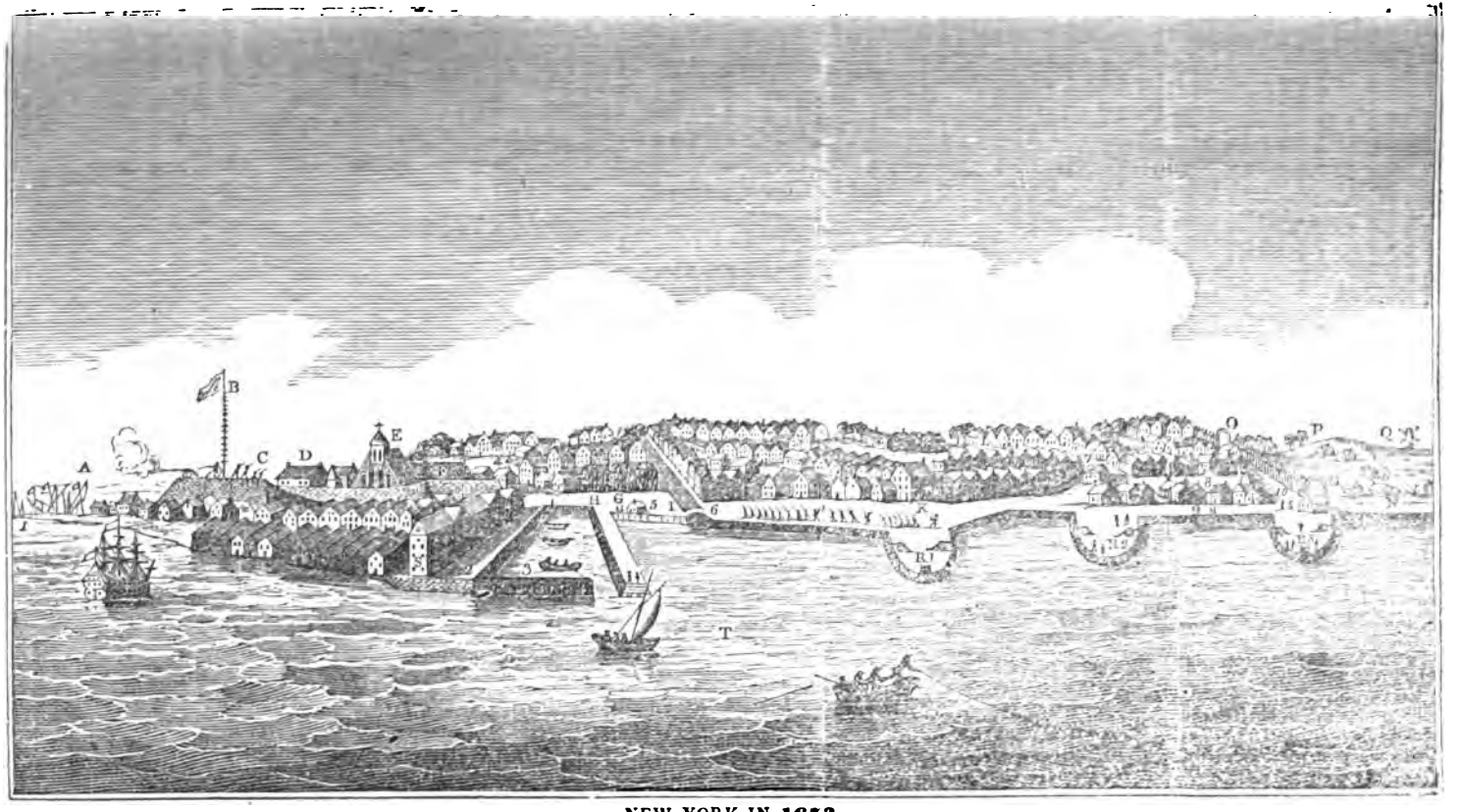
The obelisk is 220 feet in height, 30 feet square at the base, and 15 feet at top, with internal spiral stairs ascending the whole height. This monument is the highest of the kind in the world, and is said to be not much lower than the Egyptian Pyramids.

It is built of Quincy granite, eighty courses high, each course two feet and eight inches in width. The whole weight of the monument is estimated at 7000 tons. The lot of ground upon which it stands, comprising fifteen acres, cost the Society $24,000.

CITY OF NEW YORK.

[See pages 420, 421.]

THE ancient island of Manhattan is situated at the junction of Hudson and East rivers, sixteen miles from the great Atlantic ocean, and is fifteen miles long. This island is now occupied by a town which enjoys a notorious celebrity as the great city of New York. The reader may have personal knowledge of its character, as a dusty, smoky, noisy, busy, great, and mighty metropolis—grown indeed, as we intend to show, from "a dapper little town" to be the acknowledged emporium of the western hemisphere. You may have seen its fine buildings, its long streets and handsome "places," its dense throngs of inhabitants, its immense shipping, and its enormous trade. You have observed on one hand the princely dwelling, the costly equipage, and the splendid "appearances;" and on the other the squalid hut of poverty, of filth, of vice, and of extreme misery and degradation. You have perceived the eddying throngs, gathering and whirling, scattering and hurrying hither and thither in the activity of commercial pursuits, and may have been confused by the never-ending turbulence and commotion, the hundreds of mingled notes and noises which are ever arising from the multifarious trades and occupations of nearly two hundred and fifty thousand inhabitants. As you have mingled in the crowds of people, you may sometimes have been at a loss to determine the identity of the town, and have stopped to question whether you were in an oriental, a European, or an American city. You may meet Frenchmen, Spaniards, Italians, Austrians, Swiss, Germans and Russians, Chinese, Jews, Turks, Africans and Portuguese, English, Southrons and Yankees, all commingling in the same hour, in the same street, and in the same scene, and all of whom perhaps are numbered in the census of this great metropolis. Yet nothing is fixed, nothing is permanently settled—all is moving and removing, organizing and disorganizing, building up and tearing down—the ever active spirit of change seems to pervade all bodies, all things, and all places. The expanding and growing town forcibly reminds you of a burly young landlady, "who grows too fast for her garments, in spite of all the tucks, and drawing-strings, and broad plaits, made 'to let out.'" Indeed, you will observe, that notwithstanding the present vastness and populousness of the city, the extending business, the multiplying population, and the pervading and untiring spirit of enterprise, indicate that the period is not remote when the whole island will be overgrown with its millions of inhabitants.



NEW YORK IN 1673.

approached the fort in August following, and after the surrender of the town, which took place with little resistance, continued for a short time in the North river. When it returned to Holland, the "fregatt Zee-hond," commanded by Capt. Evertsen, and the Surrinam, a 44-gun ship under the control of Gov. Colve, were left, at the solicitation of the burgomasters, for the protection of the city.

vessels, as the "Snaeuw, and the City Leghter." When foreign vessels arrived, all the "skippers, ...quiers, and boatsmen in the city," were commanded to secure themselves under the stern of the ...nam, under penalty of having all their vessels burnt. In the time of Van Twiller and Kieft, ...few vessels arrived; but during Stuyvesant's administration the arrivals were quite numerous.

B. The flag staff. When vessels arrived the flag was hoisted.

C. Fort Amsterdam, called James Fort by the English. In 1673, it was "Fort William Hen-...ck." It was erected in 1635, by Gov. Van Twiller, neglected by Kieft, repaired and surrounded ...y a stone wall by Gov. Stuyvesant, and demolished and the ground levelled in 1790 and '91. It ...s situated directly south of the Bowling Green, on high ground, was a regular square, with four ...stions, two gates, and forty-two cannon.

D. The stone prison house, or jail.

E. *Gereformeerde Kerck.* The Reformed Dutch Church was erected within the fort by Governor ...ft, in 1642, the first church on this island. It was of stone, and covered with oak shingles, ...h, exposed to the weather, soon resembled slate. The manner in which this church was ...ed is thus related by Captain David Pietersz de Vriez, who performed three voyages to New ...rlands, and attempted a colony on the Delaware, and another on Staten Island:—"As I was ...y day with Commander Kieft, dining generally at his house when I happened to be at the fort, ...told me one day that he had now made a fine tavern, *built with stone*, for the English, by whom, ...they passed continually with their vessels from New England to Virginia, he had suffered much, ...who now might take lodgings there. I told him this was very good for travellers, but that we ...d very badly a church for our people. It was a shame that when the English passed, they ...d see nothing but a *mean barn*, in which we performed our worship; on the contrary, the first ...that they in New England did, when they had built fine dwellings, was to erect a fine church: ...ought to do the same, it being supposed that the West India Company were very zealous in pro-...the Reformed Church (Calvinist) against the Spanish tyranny, that we had good materials ...fine oak wood, fine building stone, good lime made of oyster shells, being better than our lime ...Holland. Kieft asked me then who would like to attend to this building? I replied, the lovers ...the reformed religion, as certainly some of them could be found. He told me that he supposed ...self was one of them, as I made the proposition, and he supposed I could contribute a hundred ...ers! I replied that I agreed to do so, and that as he was governor, he should be the first. We ...elected Jochem Pietersz Kuyter, who having a set of good hands, would soon procure good ...r, he being also a devout Calvinist. We elected also Jan Claesz Damen, because he lived ...the fort, and thus we four 'kerk meesters' formed the first consistory to superintend the build-...of the church. The governor should furnish a few thousand gilders of the company's money, ...would try to raise the remainder by subscription. The church should be built in the fort, where ...ld be free from the depredations of the Indians. The building was soon started of stone, and ...covered by English carpenters with slate, split of oak wood." The building was 72 feet ...52 broad, and 16 feet high, and cost upward of £416. The town bell was removed to this ...h, and was appropriated for a variety of singular uses.

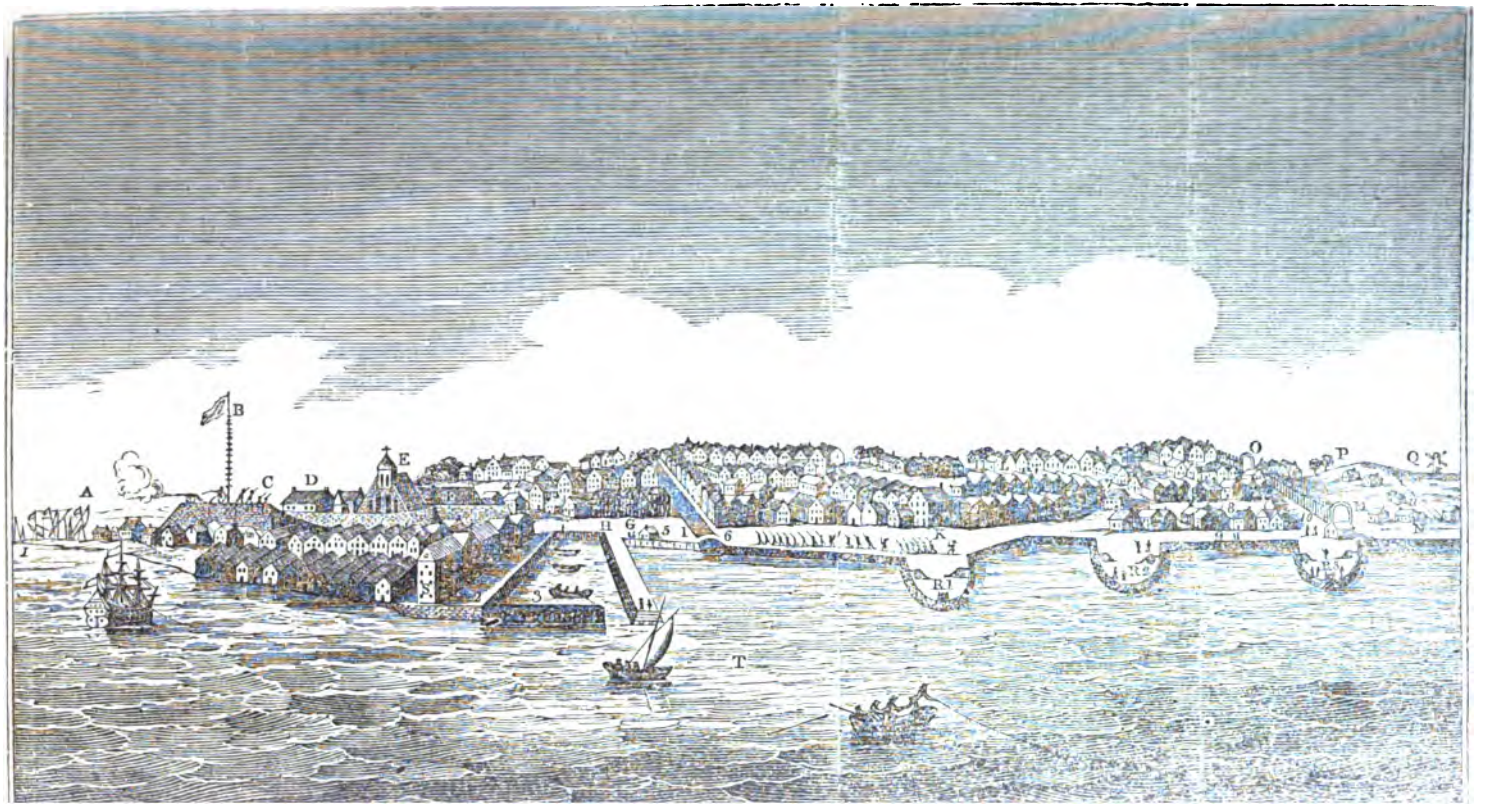
F. The governor's house, built by Van Twiller, partly of logs and brick. The secretary's office ...at the north gate, at the north-east bastion of the fort. From this office the first post-rider ...d, in the commencement of this year, (1673,) to go once a month "to Boston, and Hartford, ...ticut, and other places along the road." "In obedience to his sacred majesty's commands, ...injoynes all his subjects, in their distinct colonyes, to enter into a strict allyance and corres-...ncy with each other, as likewise for the advancement of negotiation, trade, and civill commerce, ...r a more speedy intelligence and dispatch of affayres," the messenger was appointed to pro-...on the first of January of this year. It was accordingly proclaimed, that "If any, therefore, ...any letters or small portable goods to bee conveyed to Hartford, Connecticott, Boston, or any ...r parts in the road, they shall bee carefully delivered according to the directions, by a sworne ...nger and post, who is purposely employed in that affayre."

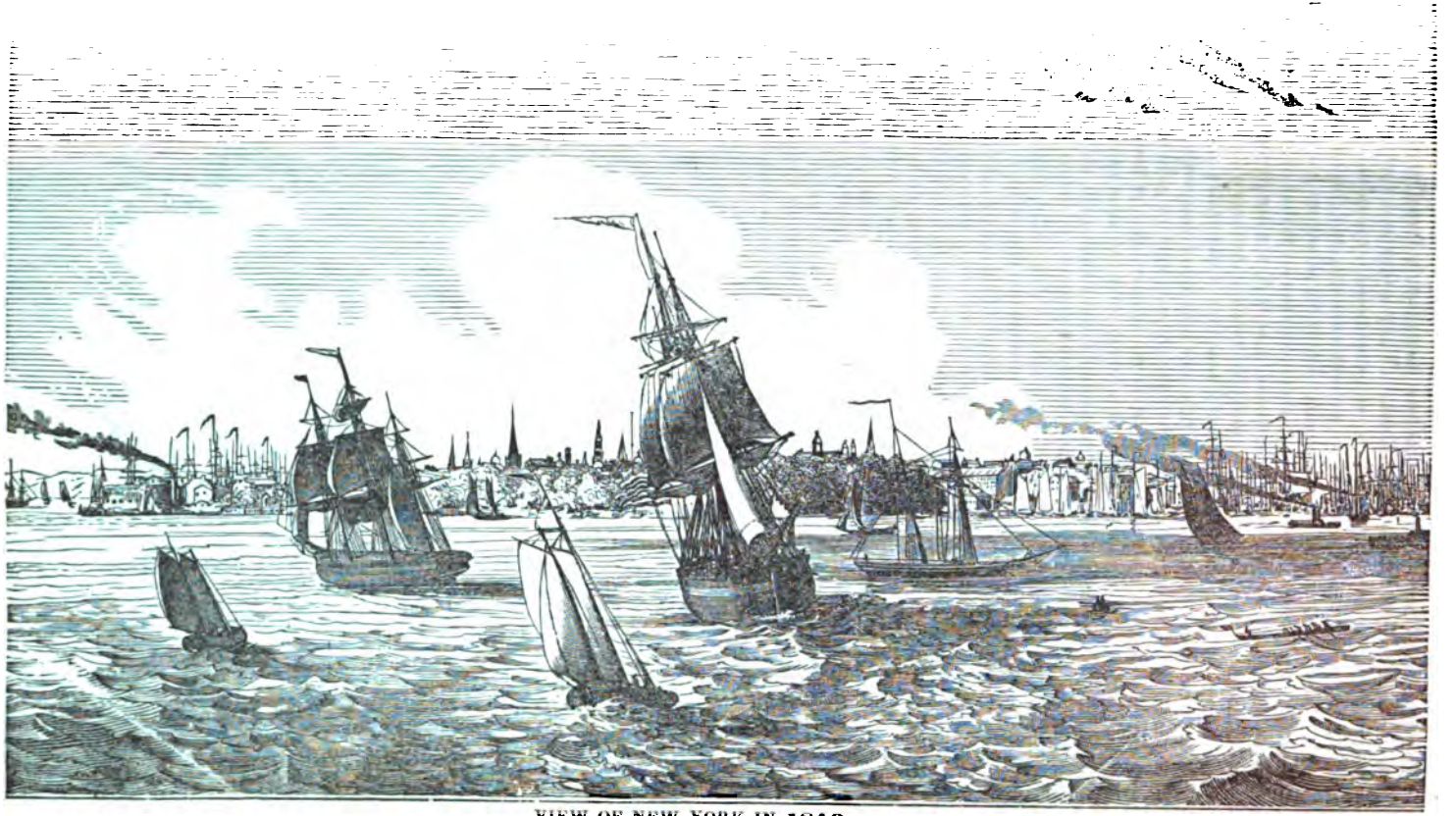
G. The magazines or public store-houses, or *Pack-huysen* of the Dutch West India Company, "lords patroons" of this city, were situated in *Winckel straet*, now Stone street.

H. The weigh, or balance, erected by Gov. Stuyvesant, and the standard weights and measures ...the balance-house, were according to those of the city of Amsterdam.

I. The *Heeren Gracht*, or Gentleman's Canal, now Broad street. It was called the *Moat*, in ...s time, and the *Great Dyke*, at the close of the English Gov. Lovelace's administration, when ...cleaned, and the streets of the city paved. It was filled up in 1676. Near the Heeren Gracht, ...*Schapen-wey*, or sheep pasture. From the Heeren Gracht to the *Stadt-huys*, was *Hoog straet*, ...street.

K. *Stadt Huys*, State House or City Hall, denominated also *Stadt-herberg*, or City Tavern, situ-...at the corner of *Hoog straet*, now Pearl street. In this celebrated building, the most memorable ...of the colony were discussed and transacted. The first public school was held in this house ...it was occupied also as a court-house. During the civil war between the house of Bayard ...Leisler, our colonial York and Lancaster, one party held possession of this house, and returned


A
B
C
D
E
O
P
Q
T



VIEW OF NEW YORK IN 1840.

The council of war of the conquerors immediately transferred its sessions from the fleet to Fort William Hendrick. They organized themselves into a military tribunal of supreme authority, and commenced remodelling the government of the city, in conformity to its ancient customs, and the exigency of the period. They accordingly re-established the order of schout burgomasters and schepens; but retained the office of mayor, adding to it that of auditor of the military council. At a call of the citizens, a sheriff, six burgomasters, and fifteen schepens were elected by a majority of votes. Anthonio Colve was commissioned governor under the provisional sanction of the states-general and the Prince of Orange. Cornelis Steenwyck was appointed counsellor of state, and Nicholas Bayard as secretary of New Netherlands, and as *geheim schryver*, or recorder of secrets; as *vendu meester*, or auctioneer, and as book-keeper and receiver-general of the revenues. The military tribunal, thus relieved from the principal burden of civil affairs, proceeded to deliberate upon measures for the permanent security of the city. A code of sanguinary military law was passed; the strictest discipline enforced among the soldiers; the mayor, at the head of the city militia, held daily parades in front of the City Hall; every evening he received the keys of the fort from the principal guard, and, accompanied by a sergeant and six armed soldiers, proceeded to lock the city gates, and station the "citizen on guard" and night watches, and returned the keys to the commanding officer. At daylight he performed the same duty in opening the gates. During the time the gates were locked, no person was allowed to go upon the "ramparts, bulwarks, rondeels, or batteries of the city," on pain of corporal punishment; and if any person, "without any distinction," entered or left the city, except through the city gates, death was the penalty. The soldiers were daily paraded and exercised at the fort, and the guard mounted upon the ramparts; sentinels were stationed at the gates, the *reveille* played every morning at daybreak, the *tap-toe* beaten every evening at nine o'clock, at the time of the ringing of the city bell, and the daily discharges of musketry and the occasional roar of cannon, reverberating on every side, warned the neighborhood of the presence and watchfulness of the military authorities.

Military discipline was very strictly enforced. A corporal's guard was on duty every day, when the muskets were examined by the sergeant and cor-

the fire of the other from the fort. It is believed that this building existed until within a few years, though in a modified form, and belonged to the heirs of Abraham Brinckerhoof about ten years [illegible]

In 1673, at the beat of the drum, half an hour before sunset, the militia (*scutlery*) of the city [illegible] their parade before the City Hall. Jacobus Van de Water, the mayor, is represented at their head. In front of the City Hall were also the stocks and whipping-post. In 1692 the English com[illegible] council ordered "a pillory, cage, and ducking-stool to be forthwith built." In the rear of the building was Mire lane, a tannery, and a bark mill. It is now Mill street.

L. The Lutheran Church, or *Luthersche Kerck*, on *de Warmoes straet*, (street of vegetables,) now Garden street. The Lutherans, Jews, and Quakers found very little toleration from the Dutch. In the English Governor Lovelace, in 1671, authorized the Lutheran congregation to erect a church and to "seek benevolences for their brethren, here and on the Delaware." The next year Edmundson, a Friend from England, was allowed to preach to the society of his order. He held an inn the first Friends' meeting in the city, and the magistrates attended.

M. The Water gate and block house, situated at the north-east corner of the present Pearl and Wall streets.

N. *Smidt's Valey*, abbreviated to *Smit's Vly*, and called by the English *Fly*. It was a piece of swampy land, where Fly Market was afterwards situated.

O. The *Land Poorte*, or City Gate, in Broadway. The wall extended to a fortification in the rear of the present Trinity Church.

P. The way to the fresh water. *Weg na't versche water*. A large swamp meadow, which communicated by a rivulet with the East river, occupied the spot near where Roosevelt street is situated. The low land below, and which is now called the Swamp, was then Beeckman's Swamp.

Q. *Wint Molen*, or windmill, erected in 1662, on the Company's farm in Broadway, between the present Liberty and Courtlandt streets.

R. 1. R. 2. R. 3. *Rondeels*, redoubts, half moons, or round bulwarks. R. 3, is the spot now probably occupied by the Tontine Coffee House.

porals. They were also on duty at one o'clock in the afternoon, and on Sunday at noon, when the gates were shut. The transactions of every day were reported to the governor by a lieutenant or an ensign. At nine o'clock, when the *tap-toe* was beaten, all the soldiers and sailors were permitted to go to sleep, "without making any noise." There was an officer, but a grade only above a common soldier, called an *adelborst*, whose business it was to go the rounds and visit the sentinels, from time to time during the night, and also to see that the soldiers kept their barracks and dwellings clean, and that no dirt or water was thrown into the fort. The duty of the corporals was to see that the muskets were kept clean and well charged, and that the accoutrements were in good order; that not more than three or four men went at once to dine; that no strong liquor was introduced into the guard-house; that the soldiers were properly instructed and disciplined, and "that neither Dutch nor Englishmen entered the gates of the fort without permission, the magistrates of the city only excepted, much less that any person whatsoever should walk on the *batteries*." They were obliged to read the code of military law every time they were on guard, "that no one might in future presume to pretend his ignorance."

This code, from all we can learn of it, must have been rather sanguinary and severe. The penalty for the first crime of blasphemy, was confinement on bread and water three days; the second offence was punished by perforating the offender's tongue with a hot iron, and banishing him the province. For mutiny; for leaving his *corps de garde* without permission from his corporal; for remaining at night out of the fort without permission of his captain; for challenging to fight; for disobeying his superior; for "opposing himself to his officer or commander;" for neglecting his duty when on service; for leaving his post, or sleeping on guard, the soldier "should lose his life without any mercy." For wounding another so that blood ensued, he should lose his hand. If he went out or came into the fort except through the ordinary gate, or cried for assistance in any fight or strife, he "should be hung and strangled." Drunkenness was punished by cashiering and banishing the offender from his company. If a soldier did not appear on parade, he was placed on the *wooden horse*, whose back was not unlike a large saw. All offenders were conducted to the jail, the whipping-post, the wooden horse, the gallows, or to the transport ship, by an officer called the *provost marshal*. If guilty of a libel on the good burgomasters, then he was conducted to a stake, with a bridle in his mouth, rods under his arm, and an appropriate label on his breast. In relation to the distribution of rations, we desire to note one particular, for the especial enlightenment of our modern commissaries. No ardent spirits were permitted to be circulated amongst the soldiers; but instead, every seven men received per week a half vat of *small beer*.

Numerous orchards, gardens, pleasure grounds, arbors, and forest-trees, ornamented and shaded the city. The aspect of the town was diversified by hill and dale. Its eminences were clustered with buildings, and the whole formed a beautiful picture from the water. The city comprised many handsome houses, constructed of plain and glazed brick, and of rock stone, and covered with red and black tiles. It contained about three hundred buildings, and twenty-five hundred inhabitants, including two or three companies in garrison, and three companies of citizen soldiers.

The expenses incurred in repairing the fortifications, and providing for the public defence, amounted this year, 1673, to eleven thousand gilders. In consequence of these "excessive expenses," a tax was levied upon the wealthiest inhabitants, "as often similar occurrences had been put in practice in our Fatherland." One hundred and thirty-four estates were taxed, which in the aggregate

were valued at about £95,000, a sum which would hardly equal a fourth part of the value of the individual property of some of the descendants of those "wealthy inhabitants."

Gold and silver were very scarce in the ancient city, and the currency in a very unsound and fluctuating state. The ministers of the gospel, and the West India Company's officers and servants, were paid in seawant or beavers. Ten years before this, beavers were valued at £1.0.0. Seawant was the name of Indian money. It was called also wampum, or peague. It consisted of beads formed of the shells of the *quahaug*, a species of clam. More strictly, the wampum was taken from the periwinkle, and was white; while the quahaug beads were black. Their current value was six beads of the white, or three of the black, for an English penny. In the time of Governor Kieft, we are informed that a vast deal of bad seawant, "nasty rough things imported from other places," was in circulation, while the "good splendid seawant, usually called *Manhattan's seawant*, was out of sight, or exported, which must cause the ruin of the country!" He therefore endeavored to expel the coarse seawant, by depreciating its value. A gilder was 3*s.* 4*d.*, a *last* was 81½ bushels, and a *schepel* three fourths of a bushel.

NEW YORK CUSTOM HOUSE.

[See page 425.]

The New Custom House is erected on the site of the old one, at the corner of Wall and Nassau streets, extending to Pine street.

The building is 177 feet long, and 89 feet wide; and the form and order of the building similar to that of the Parthenon at Athens. It stands on a basement story ascended by nineteen steps from Wall street, and six steps on Pine street. There are eight Grecian Doric columns at each front, and fifteen columns and antæ on each side attached to the walls. There is also a second row of six smaller columns back of and parallel with those of the main front, leaving a space of ten feet between the two rows, and nine feet between the inner row and the front wall of the building. Back of the two extreme columns of the inner row there are two antæ, and six antæ attached to the walls of the rear front, leaving a space of eight feet and a half between the columns and antæ. There are thus twenty-four outside columns, five feet eight inches diameter at the bottom, and thirty-two feet high, including the capital, and eighteen antæ on the two sides of the same height, five feet wide, and three feet nine inches projections from the walls. The six inner columns of the main front are four feet eight inches diameter at the bottom, and the antæ correspond. The building is two stories high, except the great business hall, part of which is vaulted as high as the roof will permit, and its centre finished with a dome sixty-two feet in diameter. This hall occupies the centre of the building, and is one hundred and fifteen feet long, leaving a small vestibule at each end to enter from. It is seventy-seven feet wide in the *centre part*, which is a circle of seventy feet diameter, with the length and breadth of the room extending beyond its circumference to these dimensions; and the four parts so extended beyond the circle are thirty-three and a half feet wide, leaving six rooms and three circular staircases in the four corners, the two largest rooms twenty-four by twenty-one feet each, besides a square staircase in the rear, and three vaults for papers at the two ends of each vestibule. The same division of room is made in the second story. Nearly the same number, shape, and sizes of rooms

are had in the basement, as above in the other stories, leaving all the area of the same shape and size as the great hall immediately above it, with the addition of sixteen fluted Doric columns to support the vaulting and the pavement under the dome of the great hall.

HALL OF RECORD, NEW YORK.

[See page 427.]

The Hall of Record, or Register's Office, is appropriated for city and county offices. It is situated on Chatham street, east side of the Park, a few yards east of the City Hall, and is one of the most chaste specimens of architecture of which the city can boast. It unites strength to beauty and simplicity. Formerly the main body of the building, destitute of ornament, was made use of as the debtor's prison, and in that terrible year, 1832, it was used for a Cholera hospital. The building has been made entirely fire proof, the floors being supported by arches, and composed of stone and brick. At present it contains the offices of the Register of Deeds, the City Comptroller, Street Commissioner, Surrogate, and Collector of Assessments, &c. It is 80 feet deep, 62 in width, and 48 in height. The two porticoes, one at each end, are supported by six marble columns each, from the Sing Sing quarries. The walls of the building, which are stone, are stuccoed on the exterior, in imitation of marble. The style is Grecian, the model being that of the Temple of Ephesus. The accompanying view is taken from the interior of the Park.

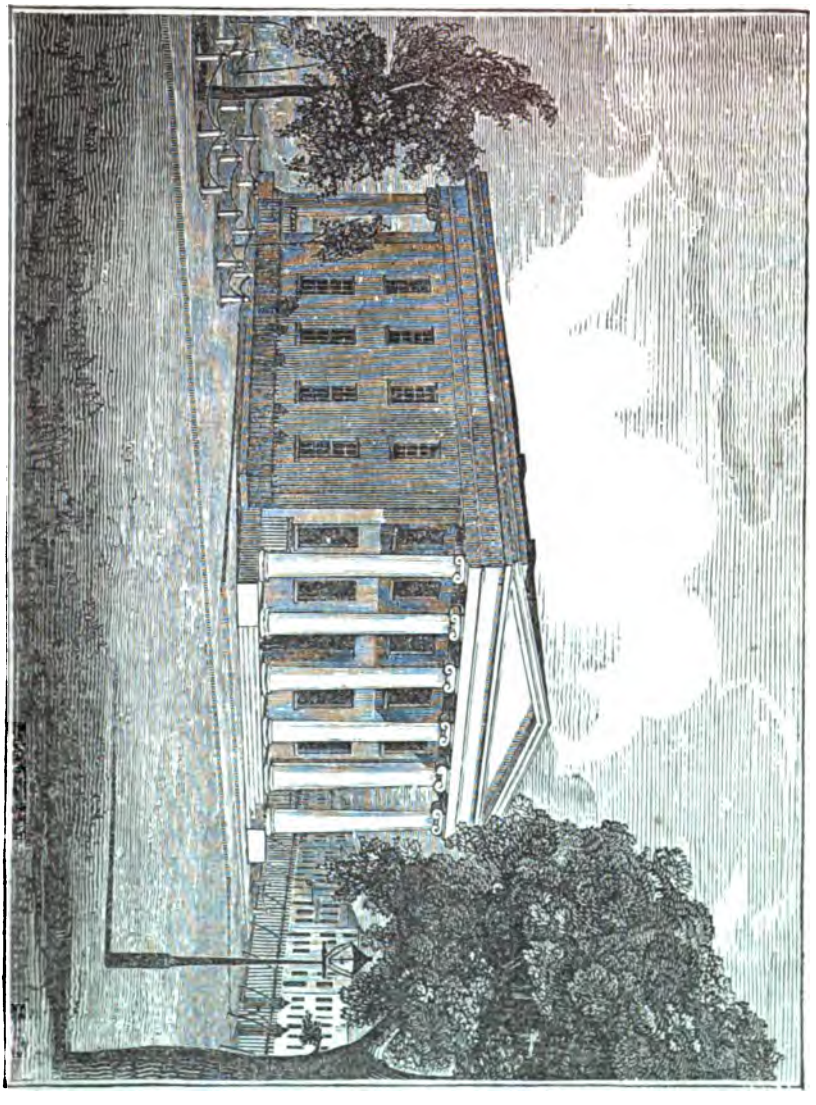
STATUE OF HAMILTON.

[See page 429.]

The statue of Hamilton was erected by the merchants of the city of New-York, and placed in the centre of the great room in the old Merchants' Exchange, where it was first exposed to view in April, 1835, and destroyed in the great fire of December of the same year. It was chiselled from a solid block of white Italian marble weighing nine tons; was about two years in the hands of the artist, Ball Hughes, Esq., and weighed when completed one and a half tons. It was purely white, highly finished, and contrasted finely with the blue granite pedestal on which it stood, fourteen feet high.

The following description of this beautiful statue was published in 1835.

If any specimen of statuary can impress the beholder with exalted ideas of the art of sculpture, it is the statue of Alexander Hamilton. To look upon it, is to see Hamilton himself, and to feel almost conscious that we are in his living presence. When we disburden ourselves of the impression that it is *he*, the mind is filled with admiration at the triumph of that noble art that can make the marble almost warm with life. There stands the form of Hamilton in majesty, yet repose; there is the broad and noble forehead, the majestic and thoughtful brow, the free, intelligent, commanding eye; you almost perceive the temples throb, you mark every line of feature, and every expression of countenance. The limbs and form are chastely imagined, and the whole is invested with dignity and grace, eloquence and power. The Roman toga hangs gracefully over the left shoulder; the right hand, resting upon an oblong polished pedestal, holds a scroll, which may represent the act empowering the funding



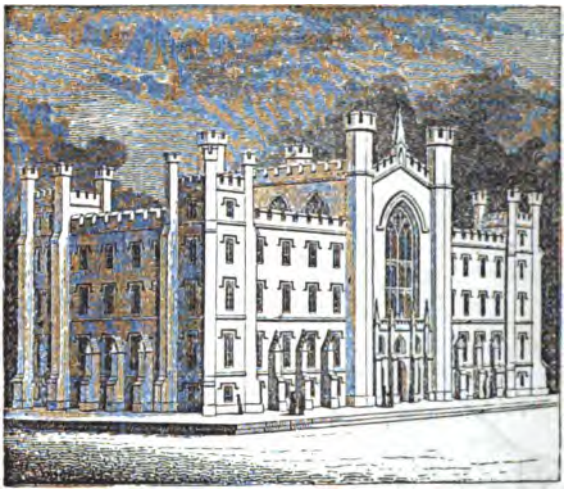
HALL OF RECORD, NEW YORK.

of the national debt, with the seal of government appended; the left arm hangs gracefully by his side. It is almost a speaking statue; beautiful in design and wonderful in the execution, which has carried the minutest parts to extraordinary perfection. What a powerful conception, strong imagination, discriminating taste, excellent judgment, and skilful hand, must distinguish the artist who can chisel such a "human form divine" out of the rude block of the quarry! To accomplish it, must be the attribute of that high order of genius to which we may apply the adage, *nascitur, non fit.* Of this order we may class Mr. Ball Hughes of this city, to whose skilful hand the country is indebted for this magnificent production. For him, the statue of Hamilton speaks higher and more endearing encomiums than the most lavish praise. To look on this statue, or the monument of Bishop Hobart in Trinity Church, or the busts of Edward Livingston and others, is to be convinced of his superior talents. We are happy to coincide with Col. Trumbull in this matter, in thinking that "there are very few pieces of statuary in Europe superior to this, and not twenty-five sculptors in the universe who can surpass this work."

THE NEW YORK UNIVERSITY.

THIS edifice is built of marble from the quarries at Sing Sing, and exhibits a specimen of the *English collegiate* style of architecture. It is situated between Washington Place and Waverley Place, and fronts Washington Square towards the west. The building is one hundred feet wide, and one hundred and eighty feet long. In front, this oblong is divided into five parts—a central building, with wings flanked by towers, one rising on each of the four corners of the edifice. This central building, or *chapel*, is superior to the rest in breadth, height, and character; and is somewhat similar to that of King's College, Cambridge, England—a masterpiece of pointed architecture, and the model for succeeding ages. It is fifty-five feet broad and eighty-five deep, including the octangular turrets, one of which rises at each of the four corners. The two ends are gabled, and are, as well as the sides, crowned with an embattled parapet. The chapel receives its principal light from a window in the western end. This window is twenty-four feet wide and fifty high. It has *eight lights* and two *embattled transoms*. The heads of the lights are *cinque-foiled* in a *plain arch*, and the divisions above are *quatre-foiled*. Over the head of the window is a drip-stone with plain returns. From the central building, or chapel, *wings* project right and left, and are four stories in height, flanked by towers of five, supported by angular buttresses of two stages, running above an embattled parapet, and are at the top themselves embattled. The windows in the wings have square heads, with two lights, a plain transom, and the upper division *trefoiled*. The heads of the windows are *labelled*, and have *plain returns*. The lower range of windows is set on a tablet, which serves as a base, and the two ranges next above are set on strings, which return around the turrets and stop against the buttresses. Buttresses are attached to the wall of the wings, both in front and flank, and rise two stories, finishing on the front face with *triangular crocketed heads*, crowned with a finial. The battlemented parts throughout the building have horizontal capping, with the exception of the gable, where the capping follows the slope. The principal entrance is under the great western window, through a richly moulded and deeply recessed portal, flanked by buttresses of two stages, the upper stage set diagonally, and rising above an embattled parapet, finishing in triangular crocketed heads, crowned with a *pinnacle*.

HAMILTON.



New York University.

The doors are of oak, richly panelled, and filled with *tracery* of *open-work*, closely studded with bronze. Entering at the west and principal door, you pass on the right to the room of the janitor, and to the apartments of the professor of chemistry and botany, or on the left to the office of the clerk of the university, and rooms for classes in the ancient and modern languages. Ascending a broad flight of steps immediately before the great western entrance, you reach the principal floor, which contains rooms devoted to the use of literary societies, one large lecture room, and rooms for classes in mathematics, natural philosophy, rhetoric, and *belles-lettres*, intellectual and moral philosophy, history, civil engineering, and the higher classes in ancient and oriental languages. On the upper floors, right and left of the chapel, are the studio of the professor of design, with the cabinet of models and illustrations, and other extensive apartments for the fine arts, libraries, and collections in natural history, mineralogy, and antiquities.

WILLIAMSBURGH, L. I.

[See page 431.]

THE village of Williamsburgh is situated on the westerly extremity of Long Island, adjoining the northern boundary of the city of Brooklyn, and immediately opposite the most populous section of the city of New York, from which it is separated by the narrow current of the East river. Like Brooklyn, the growth of this thriving village is consequent on, and identified with, the prosperity of the great Commercial Metropolis, and, like its giant neighbor, its onward progress will be greatly increased in strength and volume, with the restored commercial and financial energies of the whole nation.

That portion of the village fronting on the East river, and overlooking the city of New York, bounded on the south by the arc of the semi-circle which forms the Wallabout bay, and on the north by the mouth of Bushwick creek,

'or summer residences for the man of business, or the

t between Grand street and the Wallabout, you reach
by a gentle ascent of about a quarter of a mile, and
the eye ranges over a prospect, which for extent and
d.
illage, a short mile from the river, a number of enter-
etropolis have erected neat summer dwellings, whose
l wings, when viewed from a distance, are picturesque

ct the village with the interior, among which Maspeth
which is the dividing line between Brooklyn and the
e Jamaica and Brooklyn turnpikes, and the Jamaica
are the most prominent, and conduct the traveller
of romantic interest.
ch skirts the margin of the East river until it reaches
e of four miles, furnishing a view of the establishment
tion of pauper children, under the control of the New
s a beautiful drive, passing through a checkered land-
eadow and thicket, and giving occasional glimpses of
e one hand, and New York Bay on the other.

ALBANY.

[See page 433.]

ital of the State, one of the oldest cities in the Union,
west side of the Hudson river, 145 miles north of the
1 42° 39′ 3″ N. Lat. and 3° 12′ E. Lon. from Wash-
y called "Beaver Wyck," (i. e. Beaver town,) and
" It received its present name in 1664, in honor of
Albany, afterwards James II., in whose reign the ori-
ranted by Governor Dongan, July 22, 1686, and the
'he Mayor, Aldermen, and Commonalty of the city of
e Mayor, Recorder, ten Aldermen and ten Assistants.
terially altered by recent enactments of the Legisla-
men are merged in ten aldermen, but the corporate
It is now divided into 10 wards; in 1840, its popula-

prosperity to the enterprise of its inhabitants, and the
by the Erie and Champlain canals, which enter the
th end of the city. A basin has been formed in front
1 the river by a pier one mile and a quarter in length,
or vessels of all descriptions, and securing them from
in the spring freshets, comes down the river in im-
ies causing great damage. The city is commanding
rs to great advantage from the river. There are three
st to west, known as the Foxes Kill, the Rutten Kill,
ither side of which the land is high, being at an ele-
feet above, and gradually ascending from the river. The
eights is picturesque in the highest degree. To the
city of Troy and the adjacent villages, and in the dis-

tance the hills of Vermont. To the east the beautiful extent of country lying beyond the Hudson river, and to the south the Helderbergs, and Catskill mountains, with the river gliding at their base. The public buildings are of the most beautiful and tasteful character. The Capitol, occupied by the Legislature and the State courts; the State Hall, just completed, for the accommodation of the public offices; the City Hall, occupied for city and county purposes, and by the United States Courts; and also the Albany Academy, having 400 pupils; face the public square at the head of State street. This square is formed by the Capitol and Academy Parks, which are enclosed with substantial iron fences, erected on stone copings, and are laid out with walks lined with ornamental trees of the choicest species. A more delightful spot in summer is not to be found in any inland city in the Union. A few rods south of the square, on Eagle street, is the County Jail and the Medical College. This college was incorporated in 1839, and occupies a building granted to it by the corporation of the city, admirably adapted for the purposes of its design. The college already possesses one of the most valuable museums in the country, which has recently been greatly enlarged and enriched, by specimens imported direct from Germany and France. In addition to the academy spoken of, there is a Female Academy, which has annually from 300 to 350 pupils. This institution ranks high, and occupies a handsome and convenient edifice in North Pearl street. Connected with it is the Albany Library, numbering 9000 volumes. There is also the Female Seminary, an excellent institution, though not large, in Division street. The Albany Exchange, situated at the foot of State street, is a large and commodious building, constructed of granite. It is occupied for stores, and the post office. The Young Men's Association, established for "Mutual Improvement," also occupies rooms in this building; it was the pioneer institution of its kind in the State, and embraces all ranks and professions, now numbering 1500 members. It has an extensive reading room, supplied with the leading newspapers of this country and England; also a room furnished with the most popular and standard periodicals and reviews, native and foreign; an excellent library of about 3200 volumes, and a lecture room capable of seating 500 persons, in which two lectures a week are delivered, from the first of December to the first of March. Strangers have free access to all except the lecture room and library.

The Poor House is located one mile from the river on the south line of the city, and consists of four extensive and convenient buildings, forming a square, and has connected with it a farm of 150 acres cultivated by the inmates; there is an hospital and insane department connected with this establishment. One mile west of the City Hall is the Albany Orphan Asylum, a private incorporated institution under the government of a board of managers, which contains generally between 80 and 90 male and female children, who enjoy the benefits of education, and moral and religious instruction; it is dependant on the benevolent for its support. Connected with St. Mary's church, is St. Joseph's Orphan Asylum, a Catholic institution, for females only, which contains about 40 inmates, and is under the charge of *Sisters of Charity*. It is expected that a similar institution for boys will soon be established. In addition to the above, Albany contains 11 public squares, 24 public buildings owned by the city, viz. 3 Markets, 10 District School Buildings with dwellings attached for teachers, 11 Engine Houses, all built of brick in a substantial manner and convenient in their arrangement. There are 4 Presbyterian, 1 Associate do., 3 Dutch Reformed, 4 Methodist Episcopal, 1 African do., 2 Baptist, 1 colored do., 2 Lutheran, 3 Episcopalian, 1 Universalist, 2 Roman Catholic, and 1 Independent church, 1 Mission House, 2 Jewish Synagogues, 1 Bethel, and 1 Friend's Meeting

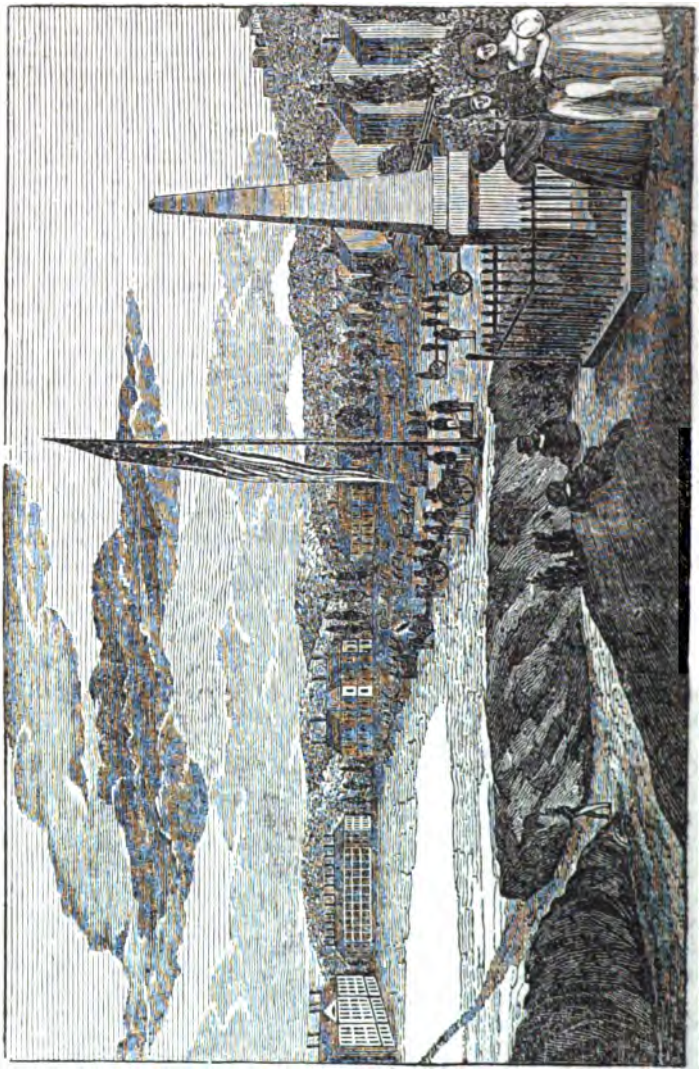
House. The Old State Hall, recently occupied for State offices, is to be converted into a museum for the reception of the geological cabinet formed under the direction of the State geological surveyors, and when completed, will be an attractive and highly interesting and instructive place of resort. Among the public institutions whose meetings are held at Albany, are the New York State Temperance Society, the State Agricultural Society, and the State Medical Society. There are also, in addition to those mentioned in the city, various benevolent, religious, and scientific institutions; among them the Albany Institute, with a valuable library and extensive museum, occupying a room in the Albany Academy. In addition to the public buildings, are the Museum, Stanwix Hall, Knickerbocker Hall, the Athenæum, the Commercial Buildings, and the Douw Buildings, the latter recently erected at the corner of State and Market streets, chiefly occupied for stores and offices, which have connected with them spacious halls for the accommodation of public assemblages. The ball room in Stanwix Hall is one of the largest in America, and is lighted by a dome 60 feet in height, supported by 4 columns and 8 antæ. The ceiling and walls of Knickerbocker Hall are tastefully ornamented in the Italian manner.

New York Gazetteer.

WEST POINT.

[See page 426.]

West Point is romantically situated on the west bank of the Hudson river, 52 miles north of the city of New York. It is the seat of a United States military academy, established by an act of Congress, in March, 1802; and the land was ceded to the United States government by the State of New York, in 1826. There are now erected 2 stone barracks, one of three and the other 4 stories in height, occupied by 250 cadets, which is the number authorized by law; an academic hall, a large 3 story stone building, 275 feet in length, by 75 feet in width, used for military exercises in winter, and as a depository of the chemical apparatus, models of fortification, artillery, architecture, and machines, and as recitation and drawing rooms; a new and beautiful 2 story stone building, to be used for the library and philosophical apparatus, constructed in the Elizabethan Gothic style of architecture, and is 150 feet in length by 60 feet in width; the north front has 3 towers suited for the astronomical apparatus; the centre tower is surmounted by a dome of 28 feet 10 inches in diameter, the whole of which revolves on its vertical axis, adapting it to the use of a large equatorial telescope; a chapel, an hospital, a mess hall, 2 cavalry stables, several workshops and storerooms, and 17 separate dwellings occupied by the officers of the institution. In addition to the above, here are located a magazine, a laboratory, soldiers' barracks, a store, and about 25 dwelling houses, occupied by families connected with the military school; in all containing a population of about 900 souls. Here also is a convenient steamboat landing and a well kept hotel, calculated to accommodate about 100 visiters. No place in the union probably exceeds West Point, in regard to its beauty of location and the stirring incidents connected with its early history, being "hallowed by the footsteps of Washington and Kosciusko," during the revolutionary struggle—the interest in which is continued to the present time by its being the residence and school of the future defenders of the Union. In 1777, immediately after the capture of Forts Clinton and Montgomery, by the British army, West Point was first occupied by the American army, and fortified at the instance of Gov.



VIEW OF WEST POINT.

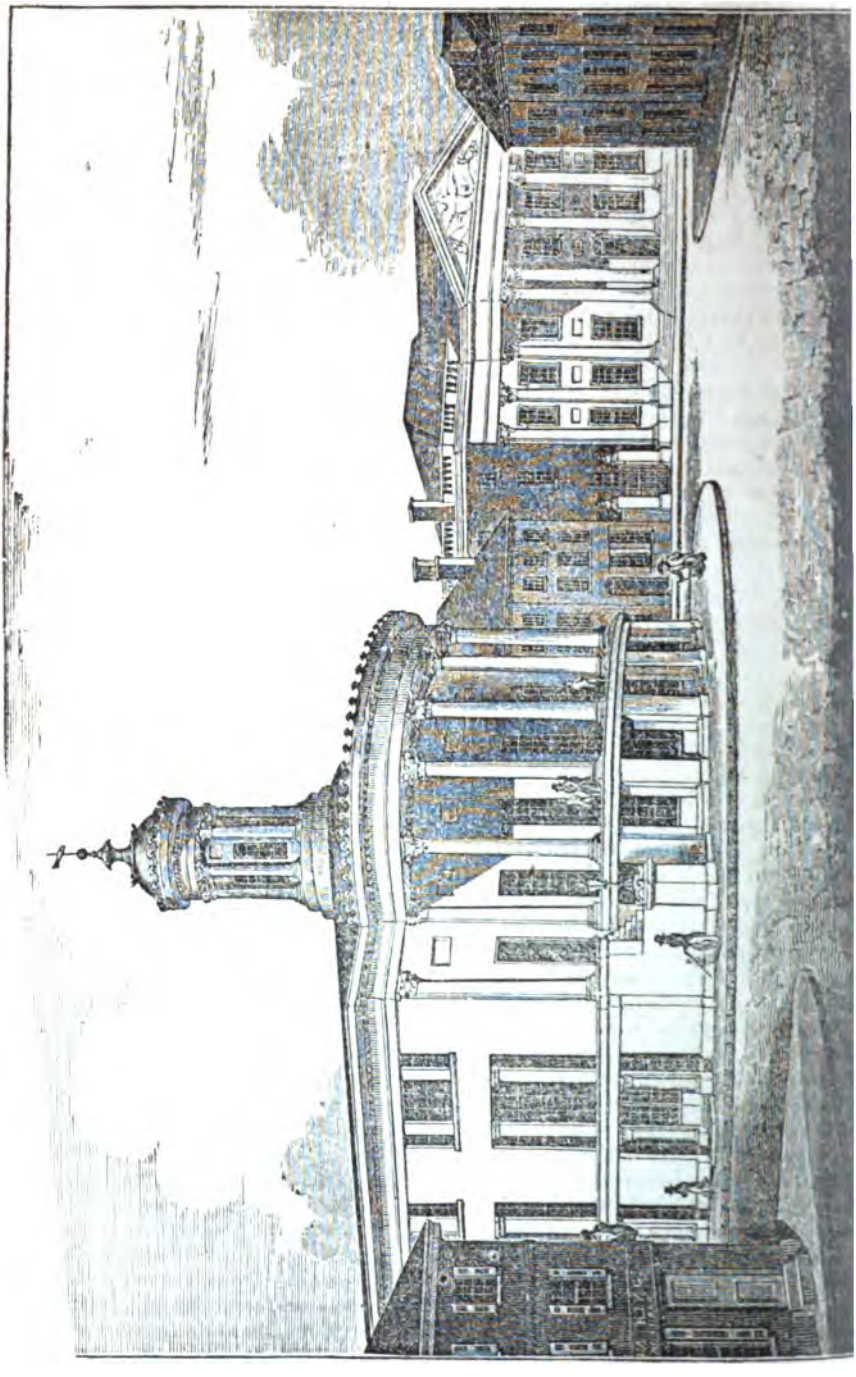
George Clinton, of revolutionary memory. At the present time are to be seen the remains of Forts Putnam and Arnold, (after the treason of the latter, called Fort Clinton,) which is situated on the extreme eastern point of this military position, 160 feet above tide water, while Fort Putnam is situated on mount Independence, 1000 yards south-west, elevated about 500 feet above the river; there are also numerous other redoubts and batteries, crowning the various eminences in the vicinity, built under the direction of the celebrated Kosciusko as engineer. In August, 1780, Gen. Arnold was assigned to the command of this important military station, extending from Fishkill to Verplanck's Point. On the 25th of September, he precipitously made his escape from his head quarters, the *Robinson House*, situated two miles below West Point, on the opposite side of the river; his treason having been discovered by the fortunate capture of Major Andre. From this period to the close of the revolutionary war in 1783, West Point was garrisoned by a strong division of the American army; after which, the garrison was reduced, and this location made a depôt for the revolutionary armament and other military stores. In 1794, at the recommendation of Gen. Washington, a military school was commenced in a building which was burnt down two years thereafter, and the school suspended until 1802. There are now connected with the West Point academy, 34 officers and professors, a company of artillery, and a detachment of dragoons, besides the cadets, who generally remain here for a period of four years, in which time they are qualified to become subaltern officers of the several corps of the army.

New York Gazetteer.

PHILADELPHIA EXCHANGE.

[See page 438.]

The Exchange is situated at the corner of South Third and Walnut streets, and on the angle formed by the intersection of Dock with Walnut and Third streets. It was built in 1833, by the merchants and citizens of Philadelphia. It is constructed entirely of marble—is a rectangular parallelogram in form, ninety-five feet front on Third street, by one hundred and fifty on Walnut street. On Dock street, however, is a semi-circular projection, ornamented from the top of the basement story with six beautiful Corinthian columns; the capitals worked by the best Italian artists. This portico is of the height of two stories, and communicates with the "Exchange Room" by means of nine separate windows, which may be used as doorways. On either side of this semi-rotunda, which is 72 feet in diameter in the basement, a flight of stone steps leads likewise to the main room of the edifice from Dock street. A hall passes through the centre of the building from Dock to Third streets, and another likewise communicates with this from the north side. The basement story is fifteen feet in height—is arched throughout, and has twelve doorways on Third street, front and flanks. On the right or north side of the hall is the Post Office, seventy-four by thirty-six feet, and on the left are several insurance offices and banks, and the session-room of the Chamber of Commerce. Two flights of stairs, one on each side of the hall, ascend to the second floor; at the head of these is the entrance to the Exchange Room, which is on the east front, extending across the whole building, and occupying an area of 3300 superficial feet. The ceiling, extending to the roof, is of the form of a dome, and supported by several marble columns. Its panels are ornamented with splendid fresco paintings, representing Commerce, Wealth, Liberty, &c., beautifully executed,



appearing to have as striking a relief as sculptured work. On one side is a book containing a list of the daily arrivals and clearances of vessels. On the right is an extensive reading-room, to which admission is gained by subscription and the payment of an annual tax. The rooms upon the right side of the hall of this floor are appropriated for the meetings of stockholders, brokers, &c. The attic story is of the same height as the basement, containing six large rooms, occupied by library associations, artists, &c. The building is further ornamented on Third street, by a sort of piazza, let into the main wall, with several marble pillars rising from the top of the basement to the roof. The roof of the building is oval, and surmounted by a circular lantern that rises forty feet. The establishment is owned and sustained by an association of merchants. It is a most convenient edifice for the purposes mentioned, and the picture which is herewith presented, embracing the Girard Banking House, is one of the most imposing for architectural display of which Philadelphia can boast.

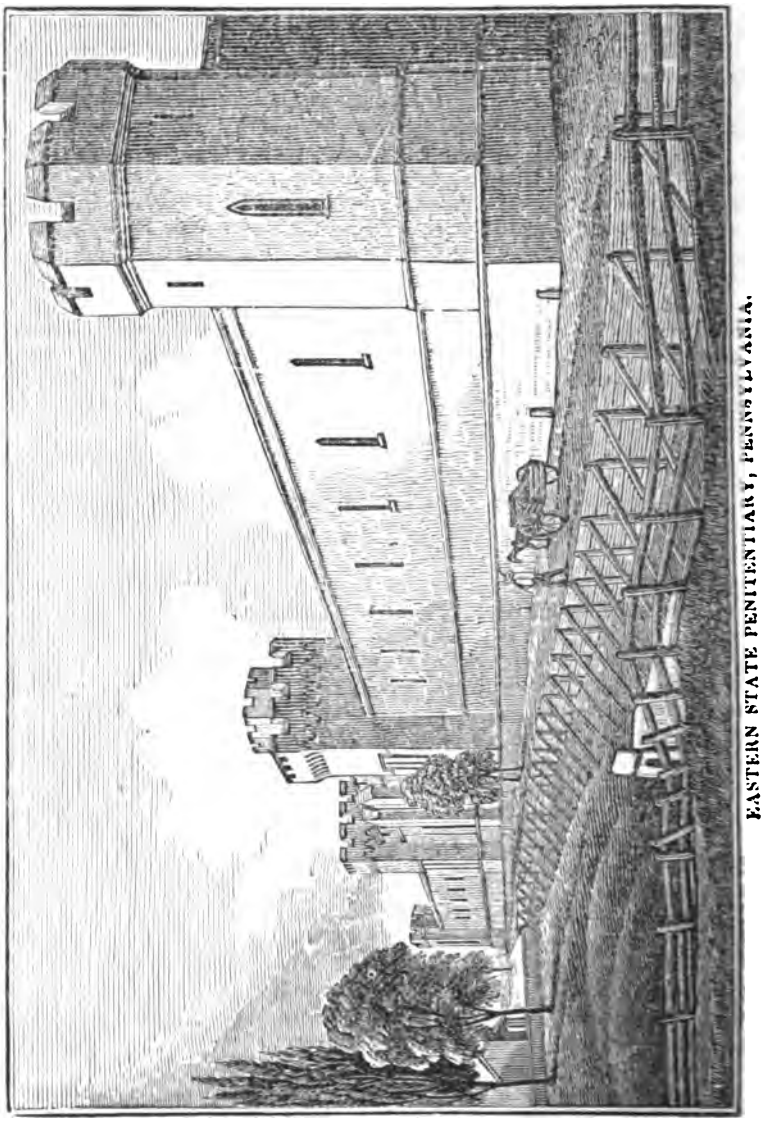
The prototype of the Philadelphia Exchange is the Choragic Monument at Athens, called by modern Athenians the Lantern of Demosthenes. This monument, erected 330 years before Christ, near the eastern end of the Acropolis, and now partly enclosed in the *Hospitium of the Capuchins*, is said to present one of the richest examples of Grecian Corinthian architecture to be found in Attica.

EASTERN STATE PENITENTIARY, PENNSYLVANIA.

[See page 460.]

The Eastern State Penitentiary is situated on one of the most elevated, airy, and healthy sites in the vicinity of Philadelphia. The corner-stone of the front building was laid on the 22d of May, 1823. Large sums have been expended for the purpose of giving an unusual degree of solidity and durability to every part of this immense structure, which is the most extensive building in the United States. The ground occupied by it contains about ten acres.

The front of this building is composed of large blocks of hewn and squared granite; the walls are twelve feet thick at the base, and diminish to the top, where they are two feet and nine inches in thickness. A wall of thirty feet in height above the interior platform encloses an area six hundred and forty feet square: at each angle of the wall is a tower for the purpose of overlooking the establishment; three other towers are situated near the gate of entrance. The façade or principal front is six hundred and seventy feet in length, and reposes on a terrace, which, from the inequalities of the ground, varies from three to nine feet in height; the basement or belting course, which is ten feet high, is scarped, and extends uniformly the whole length. The centre building is two hundred feet in length, and consists of two projecting massive square towers thirty feet high, crowned by projecting embattled parapets, supported by pointed arches, resting on corbels or brackets. The pointed munnioned windows in these towers contribute in a high degree to their picturesque effect. The curtain between the towers is forty-one feet high, and is finished with a parapet and embrasures. The pointed widows in it are very lofty and narrow. The great gateway in the centre is a very conspicuous feature; it is twenty-seven feet high, and fifteen wide, and is filled by a massive wrought iron portcullis, and double oaken gates, studded with projecting iron rivets, the whole weighing several tons; nevertheless, they can be opened with the greatest facility.



EASTERN STATE PENITENTIARY, PENNSYLVANIA.

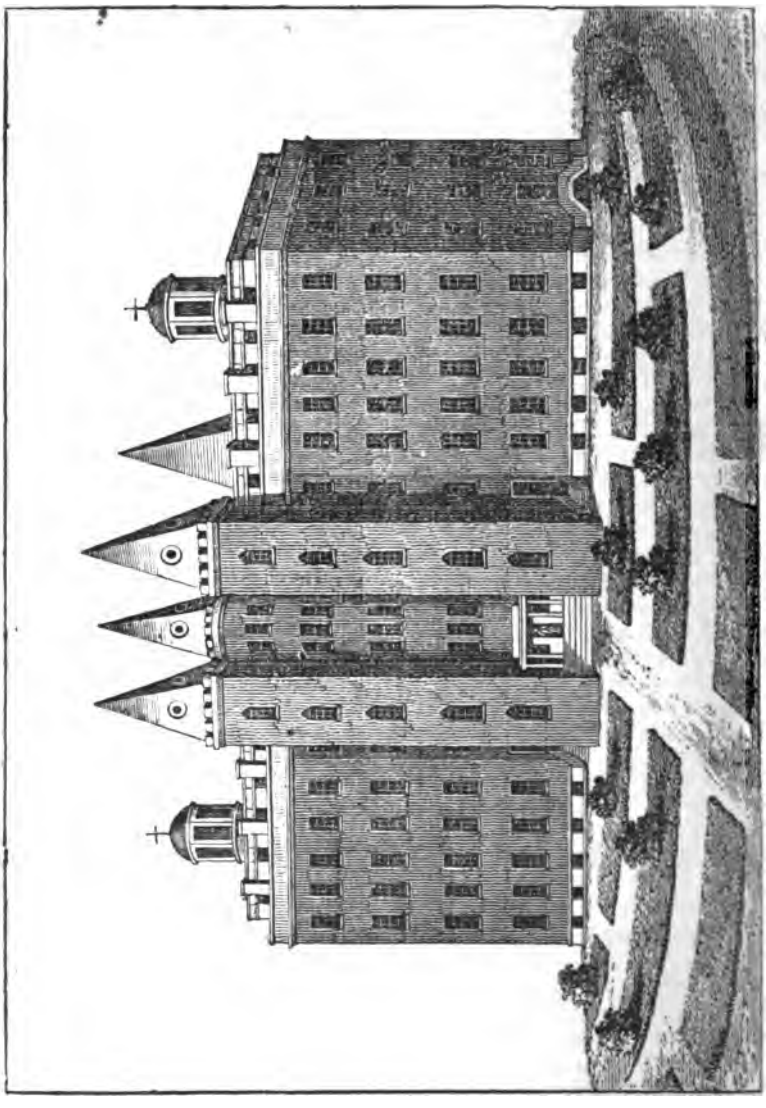
On each side of this entrance, which is the most imposing in the United States, are enormous solid buttresses, diminishing in offsets and terminating in pinnacles. A lofty octangular tower, eighty feet high, containing an alarm-bell and clock, surmounts this entrance, and forms a picturesque proportional centre. On each side of this main building, which contains the apartments of the warden, keepers, domestics, &c., are screen wing walls, which appear to constitute portions of the main edifice; they are pierced with small, blank, pointed windows, and are surmounted by a parapet; at their extremities are high octangular towers terminating in parapets, pierced by embrasures. In the centre of the great courtyard is an observatory, whence long corridors, eight in number, radiate. On each side of these corridors the cells are situated, each at right angles to them, and communicating with them only by small openings, for the purpose of supplying the prisoner with food, and for the purpose of inspecting his movements without attracting his attention; other apertures for the admission of cool or heated air, and for the purpose of ventilation, are provided. A novel and ingenious contrivance in each cell prevents the possibility of conversation, preserves the purity of the atmosphere of the cells, and dispenses with the otherwise unavoidable necessity of leaving the apartment, except when the regulations permit; flues conduct heated air from large cockle stoves to the cells. Light is admitted by a large circular glass in the crown of the arch, which is raking, and in the highest parts sixteen feet and six inches above the floor, which is of wood, overlying a solid foundation of stone. The walls are plastered and neatly white-washed; the cells are eleven feet nine inches long, and seven feet six inches wide; at the extremity of the cell, opposite to the aperture for inspection, previously mentioned, is the door-way, containing two doors; one of lattice work, or grating, to admit the air and secure the prisoner; the other composed of planks to exclude the air, if required; this door leads to a yard eighteen feet by eight, the walls of which are eleven and a half feet in height, attached to each cell. The number of the latter in the present plan is only two hundred and sixty-six, but it may be increased to eight hundred and eighteen without resorting to the addition of second stories.

This penitentiary is the only edifice in this country which is calculated to convey to our citizens the external appearance of those magnificent and picturesque castles of the middle ages, which contribute so eminently to embellish the scenery of Europe. Mr. John Haviland was the architect.

WASHINGTON MEDICAL COLLEGE, BALTIMORE.

[See page 442.]

The College buildings are constructed in a style of architecture which will vie with the proudest collegiate edifices. They are situated on the southeast corner of Market and Hampstead Hill streets, on the most elevated ground within the limits of Baltimore, and command a magnificent view of the Patapsco, of the city, and the surrounding country. The buildings will range one hundred and ninety-five feet on Hampstead Hill street, and consist in part of a circular centre building, forty feet in diameter, having four stories at unequal height, for the convenience of Lecture halls, Laboratory, Dissecting rooms, Museum, Library. This part of the edifice is flanked at four corresponding equi-distant points by turrets, six stories high, castellated with obelisk roofs, and decorated with Gothic windows and doors. The two wings are each sixty feet by forty, being five stories in height. The apartments are numerous, spacious, and lofty,



WASHINGTON MEDICAL COLLEGE, BALTIMORE.

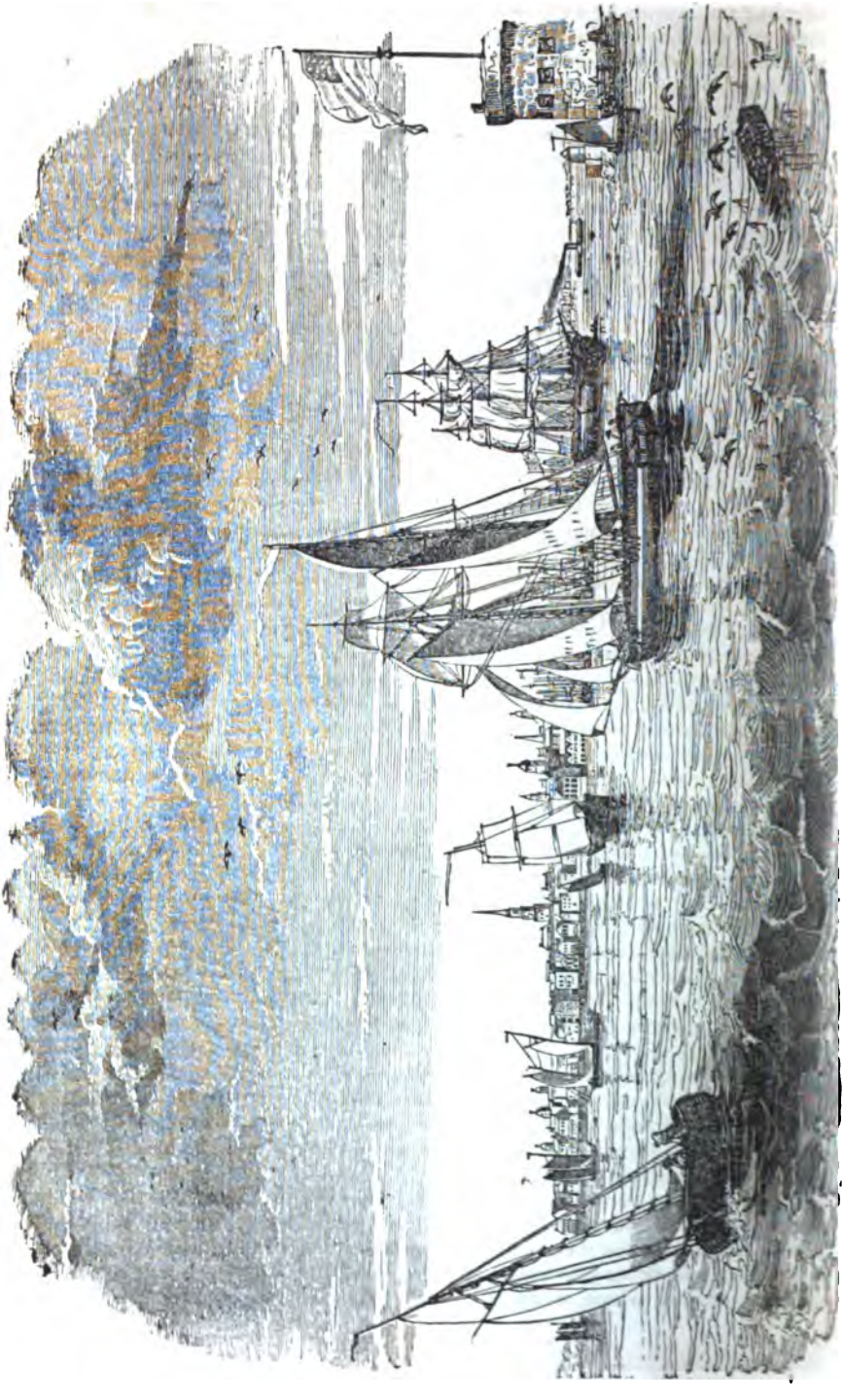
affording ample room for a classification of the patients, and will contain between three and four hundred beds. The apartments appropriated to house students will accommodate forty or fifty individuals, and are most agreeable and inviting to young gentlemen who may prefer to reside in the College edifice. There are also apartments specially designed for strangers who may be taken ill in the city, and who prefer being retired from the noise and confusion of a hotel, and wish a place where good nurses, medical attendance, and every convenience contributing to their comfort will be provided. It is believed that this peculiar feature will render this Institution very popular with strangers who may take apartments here, and who can have the attendance of any physician they prefer, and will be free to receive their friends and visiters as unrestrained as in their own homes. No infectious diseases are admitted within the wards of this hospital.

CHARLESTON, S. C.

[See page 444.]

The city of Charleston is situated in lat. 32° 47′ north, and lon. 80° 00′ 52″ west from Greenwich. It is a peninsula formed by the Ashley river on the west, Cooper river upon the north, and the Atlantic ocean on the south and southeast. The harbor is one of the finest in the United States, and is well protected from hostile incursions by castles and forts. The city is located on a flat and even surface, but appears to considerable advantage upon entering the harbor. The houses, which are chiefly of wood, have a dusky appearance, arising partly from their antiquity, and partly from the corrosive influence exerted by a saline atmosphere upon painted buildings. With the exception of Broad street, running through the city from east to west, and Mutiny street, extending its entire length from north to south, the streets are for the most part narrow, but less circuitous and irregular than those of Boston and some other of our older cities. The principal public buildings are the court-house, city-hall, guard-house, fire-proof (state) building, custom-house, St. Andrew's hall, South Carolina society's academy, Charleston college, orphan-house, medical college, hospital, poor-house, and jail. Of the churches, the most venerable (since the destruction of old St. Philip's by fire,) is the St. Michael's at the intersection of Broad and Mutiny streets. The steeple of this church is very beautiful. Its total altitude, from the pavement to the top of the vane, is 186 feet three inches. The length of the vane is seven feet three and a half inches. St. Peter's, a new Episcopal church, is also a neat and chaste edifice, built in more modern style. St. Philip's, which was founded in 1713, and destroyed by fire in the winter of 1835, has been rebuilt upon its ancient plan, which was very grand and imposing. Besides these, are Baptist, Methodist, Presbyterian, Lutheran, Unitarian, Catholic, Universalist, and French Protestant churches. The most influential, if not the most numerous sect of Christians in Charleston, are the Episcopalians. The standard of pulpit eloquence in this city is at the present moment more elevated than formerly, and it boasts of divines of distinguished talents and piety.

The public and private edifices of Charleston are not remarkable for architectural elegance, but are, for the most part, plain and substantial buildings. The burnt district, the theatre of a ruinous and extensive fire which happened in 1835, is sold out to purchasers upon the condition that handsome buildings shall be erected, which, when completed, will doubtless improve greatly the

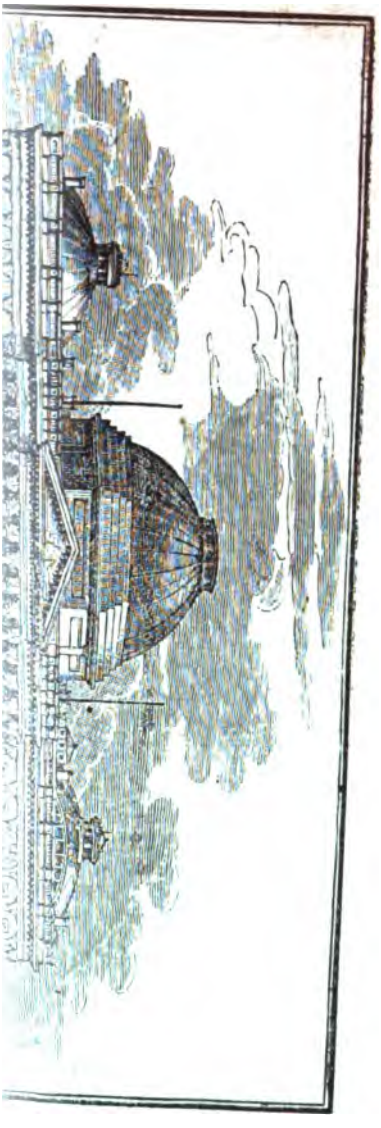


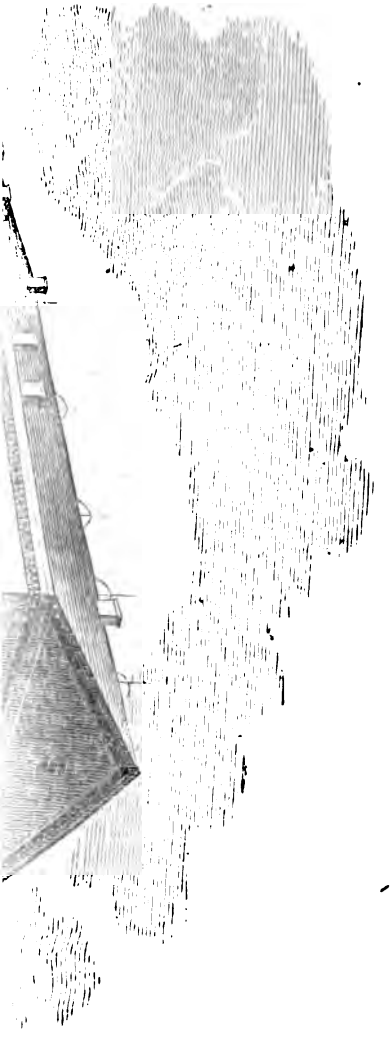
VIEW OF CHARLESTON, S. C.

appearance of the city. Horticulture is much attended to here. The principal fruits cultivated are the fig, orange, peach, pomegranate, and grape. The gardens are embellished with every species of flower, foreign and indigenous, and relieved by shrubbery of a rich and beautiful foliage. On the anniversary of the Horticultural Society, fruits and flowers of every flavor and hue are exhibited publicly, and to those who offer the most rare and curious, premiums are awarded. On these occasions, the ladies are often the most successful competitors.

The population of Charleston, including the suburbs, is probably 40,000. Of foreigners, the French form a considerable proportion, but Charleston has many adopted citizens, who have resorted to it from every section of the globe. The mercantile class is composed, in a great measure, of settlers from the New England States. The citizens of Charleston are proverbial for their hospitality, chivalrous feelings, and elegant and refined manners. They entertain the nicest sense of honor, and are prompt to revenge an insult, but no people are more generous in their friendships, more steadfast in their attachments to the worthy, or more observant of all the proprieties that characterize civilized life. A true Carolinian is a high-minded gentleman all the world over; and into whatever errors he may be betrayed by inadvertence, he never forgets what is due to the honor of a man and the pride of a Southron. The planters, who constitute the most wealthy portion of the citizens, reside in the country during the winter and spring, but spend their summers in the city when they do not travel, which they often do, scattering the proceeds of their large incomes, with no niggardly spirit, over the whole length and breadth of our common country. Many of them have summer-houses upon Sullivan's Island, a few miles from town, whither they resort in unhealthy seasons, or in healthy ones, for relief from the heat of the city, and to enjoy, with their families around them, the fine and salubrious sea-breezes. The ladies of Charleston are less ambitious of costly dress and personal decoration than those of Baltimore or New York, but what is saved by this species of economy is generally expended in fine equipages. Their complexions are usually less fair and blooming than those of northern females, but southern brunettes are often very beautiful. The fashionable promenade of the ladies of Charleston is King street, where they make a fine display in carriages, barouches, and as pedestrians from eleven o'clock till one in the early part of the day, and from four to six in the evening. It is a little singular that Charleston, where the pride of State supremacy is proverbial, should retain the name of *King street* for its most aristocratic thoroughfare, while Boston, nearly a half century ago, proscribed the name as a badge of toryism, and substituted that of State street instead of it. In view of this matter, we can only say, that names are not always the signs of things.

Prejudices have been entertained against Charleston as an unhealthy city, but without reason. It is, we believe, one of the healthiest places upon the face of the globe. By accurate calculations, drawn from a comparison of the bills of mortality of Charleston, and the principal cities of Europe, it would appear that the former, in proportion to its number of inhabitants, and notwithstanding the occasional prevalence of destructive epidemics, deserves to be regarded as pre-eminently healthy. A gradual improvement has taken place in the climate, arising in part from the clearing of the forests in the neighboring lowlands, but more especially from the attention which is paid to cleanliness, and the prevalence of social order. In none of our cities is there a more effective police; in none are the streets kept in better order;—in none is there less insubordination and fewer riots.





nd will contain between
lated to house students
agreeable and inviting
College edifice. There
ho may be taken ill in
nd confusion of a hotel,
nce, and every conveni-
It is believed that this
with strangers who may
e of any physician they
siters as unrestrained as
ated within the wards of

orth, and lon. 80° 00′ 52″
the Ashley river on the
ocean on the south and
United States, and is well
. The city is located on
dvantage upon entering the
have a dusky appearance,
e corrosive influence ex-
. With the exception of
o west, and Mutiny street,
treets are for the most part
of Boston and some other
are the court-house, city-
-house, St. Andrew's hall,
ege, orphan-house, medical
urches, the most venerable
the St. Michael's at the in-
ple of this church is very
he top of the vane, is 166
feet three and a half inches.
and chaste edifice, built in
ed in 1713, and destroyed
its ancient plan, which was
ist, Methodist, Presbyterian,
rench Protestant churches.
of Christians in Charleston,
equence in this city is at the
s boxes of divines of distin-

s not remarkable for archi-
and substantial buildings.
tensive fire which happened
on that handsome buildings
nbiless improve greatly the

ipal
gar-
and
of
ited
are
com-

0. Of
s many
. The
n New
spitality,
ne nicest
re more
e worthy,
. A true
whatever
due to the
nstitute the
the winter
avel, which
no niggardly
y. Many of
m town, whi-
lief from the
, the fine and
tions of costly
York, but what
fine equipages.
ose of northern
fashionable pro-
make a fine dis-
clock till one in
g. It is a little
cy is proverbial,
atic thoroughfare,
ne as a badge of
a view of this mat-
f things.

s an unhealthy city,
est places upon the
a comparison of the
of Europe, it would
abitants, and notwith-
ca, deserves to be re-
ent has taken place in
ests in the neighboring
is paid to cleanliness,
es is there a more of-
der;—in none is there

THE UNITED STATES SEAT OF GOVERNMENT.

[See page 447.]

The District of Columbia, in which is situated the city of Washington, the seat of the Federal Government, is a tract ten miles square, embracing within its area the confluence of the east and west branches of the noble Potomac, or Potowmak. It was ceded to the United States in 1800, by the States of Maryland and Virginia, at which time the seat of the Federal Government was transferred thither, from Philadelphia. It contains about 40,000 inhabitants, including about 12,000 blacks, one half of whom are slaves. It is divided into two counties, Alexandria and Washington, and contains three cities, Washington, Alexandria, and Georgetown; the whole District is under the immediate control of Congress.

The city of Washington is situated on the east side of the Potomac, at the point of junction of the two branches, to which place the river is navigable for ships of the line.

The city is beautifully and extensively laid out, the streets all running in the direction of the cardinal points of the compass, and crossing each other at right angles. Besides these streets, avenues, named after the different States of the Union, traverse these rectangular sections, diagonally; and, like some of the streets, are from one hundred to one hundred and sixty feet wide, handsomely shaded with trees. Many of them terminate on the hill on which the Capitol is situated, and diverge like rays from a centre.

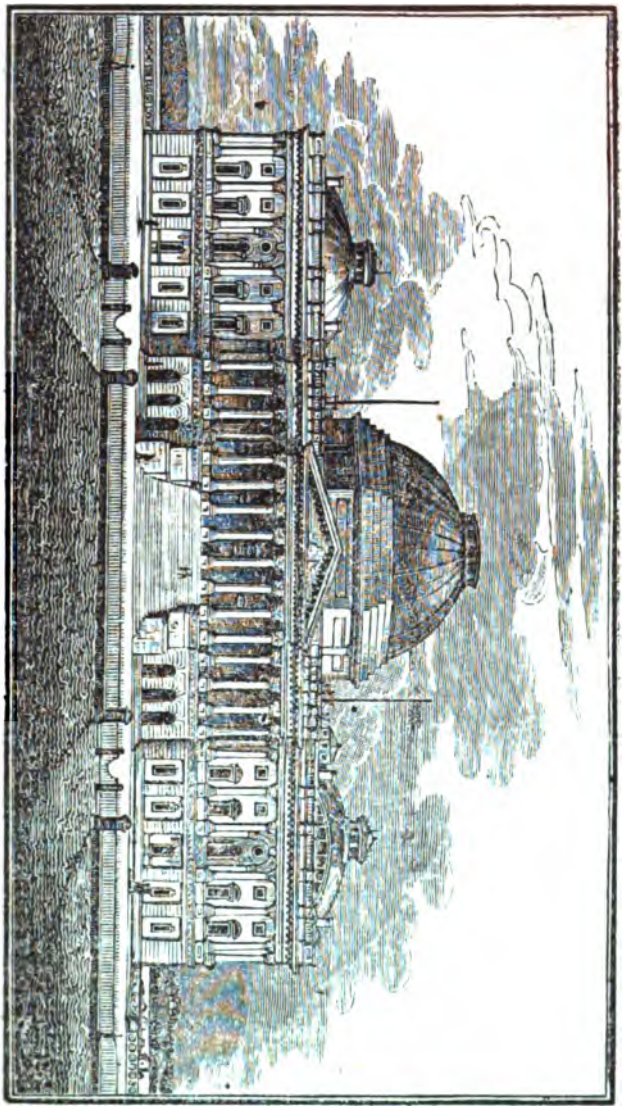
On the eastern side of the city, upon the Anacostia, or east branch of the Potomac, is the navy-yard. On the west it is separated from Georgetown by Rock creek; the Potomac, which separates it from Alexandria, is crossed by a bridge more than a mile in length.

Notwithstanding the extent of the city, its population is small, being only about 20,000. It appears more like a group of villages than a continuous city, as the buildings are in clusters, principally in the neighborhood of the Capitol, the navy-yard, and Pennsylvania avenue. On the latter is situated the President's house, about a mile and a half from the Capitol. It is built of freestone, two stories high, with a basement; one hundred and eighty feet long and eighty-five feet wide. Near it are four spacious brick buildings, containing the offices of the executive department.

THE CAPITOL.

This magnificent building is built of freestone, and, like the President's house, is painted white. It is of the Corinthian order, consisting of a centre and two wings, being three hundred and fifty feet long, one hundred and twenty feet high to the top of the central dome; each wing one hundred and twenty feet long, and seventy feet in height. In one is the Senate Chamber, of a semi-circular form, seventy-four feet long; in the other the Hall of Representatives, of the same shape, ninety-five feet long and sixty in height.

Under the central dome is the rotunda, ninety feet in diameter, and ninety-six feet in height. It is constructed of white marble, and the floor beautifully tesselated with the same material, giving an imposing effect. It contains four relievos, representing the landing at Plymouth, the treaty between Penn and the Indians, the preservation of Smith by Pocahontas, and the adventure of Boone with two Indians. There are also four paintings executed by Col. John Trumbull, representing the Declaration of Independence, the surrender of Burgoyne, the surrender of Cornwallis, and Washington's resignation of his commission



THE CAPITOL, AT WASHINGTON.

of commander-in-chief. An appropriation has been made by Congress, for the purpose of filling the vacant panels in the rotunda with paintings, one of which is now completed, and the others are in process of execution.

In the west, adjoining the rotunda, is the library of Congress, containing about 16,000 volumes. They are in a hall ninety-two feet long, thirty-four wide, and thirty-six feet high. Opposite the east front is Capitol Square, containing twenty-two acres, and within the area on the west front is a monument erected to the memory of the gallant naval officers who fell at Tripoli in 1804. From either front a beautiful prospect is presented to view, embracing the broad Potomac, and the pleasing diversity of landscape scenery upon its banks.

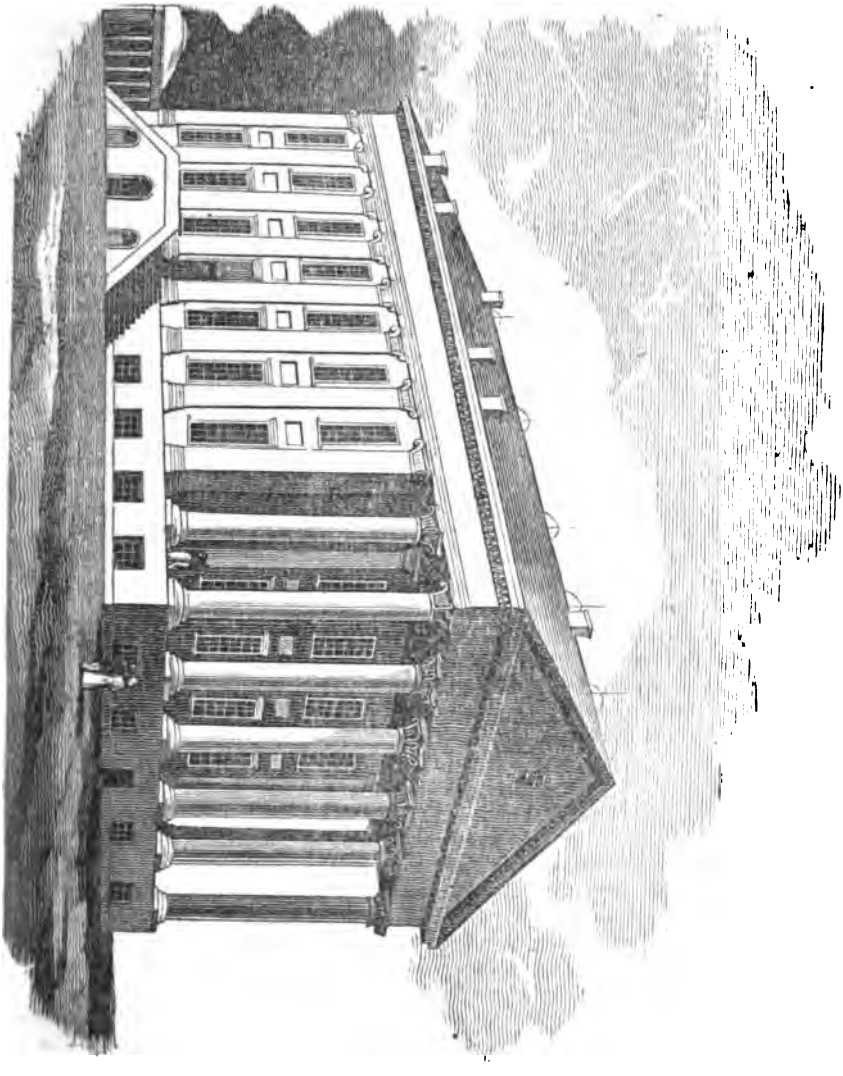
THE CAPITOL OF VIRGINIA, AT RICHMOND.

[See page 449.]

RICHMOND, the largest city in the State of Virginia, and the seat of government, has a population of 16,000, and is situated at the head of tide water on the James river. The town rises gradually from the river, and with its many elegant brick houses, presents a fine appearance. The public buildings are a court-house, a State prison, an almshouse, a museum, eight churches, and the CAPITOL. It is appropriated chiefly to the purposes of the State Senate and Assembly. It stands on the highest ground in the city, and the views from its top are extensive and interesting. This city is one hundred and twenty miles from Washington, and one hundred and fifty from the mouth of the river. There are two bridges across the river at this place, and falls a short distance above. A canal has been dug around the falls, however, so that a continuous boat navigation is secured for two hundred and twenty miles. Richmond is a thriving town in point of trade, and the means of general education are not neglected.

Virginia was amongst the first of the colonies that manifested that glorious spirit of resistance to the oppression and aggression of Great Britain, which wrought our Independence. She was always forward in seconding the spirit and measures of her sister colonies against the common enemy, and met the demands of her country with laudable zeal and disinterested patriotism. The constitution of Virginia was adopted the next day after the Declaration of Independence, but has been recently revised and amended. Nine of the signers of the declaration, including its immortal author, were natives of Virginia, viz; —Thomas Jefferson, John Penn, Richard H. Lee, Fr. Lightfoot Lee, Carter Braxton, George Walton, George Wythe, Benjamin Harrison, Thomas Nelson, jr. Virginia also produced George Washington, Patrick Henry, Arthur Lee, James Madison, James Monroe, and John Marshall.

In 1840, Virginia contained 1,239,797 inhabitants, of whom 448,987 were slaves. The principal rivers are the Potomac, Shenandoah, Rappahannock, York, James, Appamattox, Elizabeth, Staunton, Kenhawa, Ohio, Sandy, and Monongahela. The Blue Ridge extends through the central part of the State, and there are other mountains in the State. Iron, lead, coal, limestone, and chalk, are found in abundance. The chief towns are Richmond, Norfolk, Petersburgh, Lynchburgh, Fredericksburgh, Winchester, Portsmouth, Williamsburgh, and Shepherdstown. The University of Virginia is established at Charlottesville, besides which there are several other colleges.



THE CAPITOL OF VIRGINIA, AT RICHMOND.

ARCADE IN PROVIDENCE, R. I.

[See page 451.]

This is said to be the most spacious and splendid building of the kind in the United States. There are two fronts of hammered granite, seventy-two feet wide, presenting colonnades, of the pure Doric style, of six columns each. These columns are twenty-five feet in height; the shafts being twenty-two feet in length, and each of a single block. The building occupies the whole space between two streets, being two hundred and twenty-two feet in length. The body of the edifice is built of split stone, covered with cement. The building was finished in 1828, and at the expense of one hundred and thirty thousand dollars.

There are other public buildings, and several dwelling-houses in Providence, of elegant structure. Of the former, are the State-house, of brick, several churches, the halls of Brown University, the Dexter Asylum, and the Friends' Academy, or boarding-school. The most spacious and elegant churches are, two Unitarian, the first Baptist, and St. John's, Episcopalian. The Dexter Asylum, for the poor of the city, is a brick building of three stories, one hundred and seventy feet in length, and forty-five in width. The Friends' Academy, which belongs to the yearly meeting of New England, is also a spacious structure of brick.

The University in Providence takes its name from Nicholas Brown, of that city, its most munificent benefactor. It consists of two halls, both of brick, of four stories, one hundred and fifty feet long, and forty-six wide; and Hope College, erected in 1822, four stories high, one hundred and twenty feet long, and forty wide. The library and philosophical apparatus are very ample; and the University is in a flourishing state, under its present learned head.

Providence is the only city in Rhode Island; and its population much larger than any town in that State. It has increased greatly within thirty, and even within fifteen years. It has much outstripped Newport in enterprise, population, and wealth. The number of inhabitants is about twenty-two thousand; and it is now the second city or town in the New England States, for population. It lies on both sides of Providence River, so called; more properly, the head of the Narraganset Bay, where it receives the Mooshasuck River. The city is connected by two bridges which have been thrown over the river, near the head of the tide-waters. Providence is about thirty-five miles from the Atlantic ocean; and the largest ships can approach to the lowest wharves. The distance from Boston is forty miles, nearly S. S. W. A rail-road between these two cities has been in most successful operation for several years. There is also a canal from Providence to Worcester, near the centre of Massachusetts; and the transportation by means of it is increasing every year.

Providence is memorable as the place of retreat and settlement of Roger Williams, when persecuted in Massachusetts, in 1635. He was an eccentric and opinionated man, but sincere and pious. The rulers of Massachusetts treated him with unjustifiable severity. Their plea was necessity and expediency; a plea easily made by the misguided bigot, the honest zealot, or the selfish tyrant. The good people of the Bay State thought that their civil and religious authority was opposed. Williams concluded, as they had done five years before, that he would go into exile, rather than give up his religious opinions. Governor Haynes told Mr. Williams, that "he believed God intended this new continent for *all sorts* of consciences."

MOLDE IN PROVIDENCE, R. I.

MONUMENTAL CHURCH, AT RICHMOND, VA.

[See page 453.]

THE Monumental Church, at Richmond, was erected in 1813, on the spot where the theatre stood. It was dedicated on the 4th of May, 1814. The Rev. W. H. Wilder delivered the dedication sermon. It is an elegant edifice of an octagon form. The steeple, on the northeasterly side, is one hundred and thirty feet high. On the northwesterly side of the church, and adjoining it, is the monument, the foundation of which occupies thirty-six feet square, within the walls of which is engraved the following inscription:—

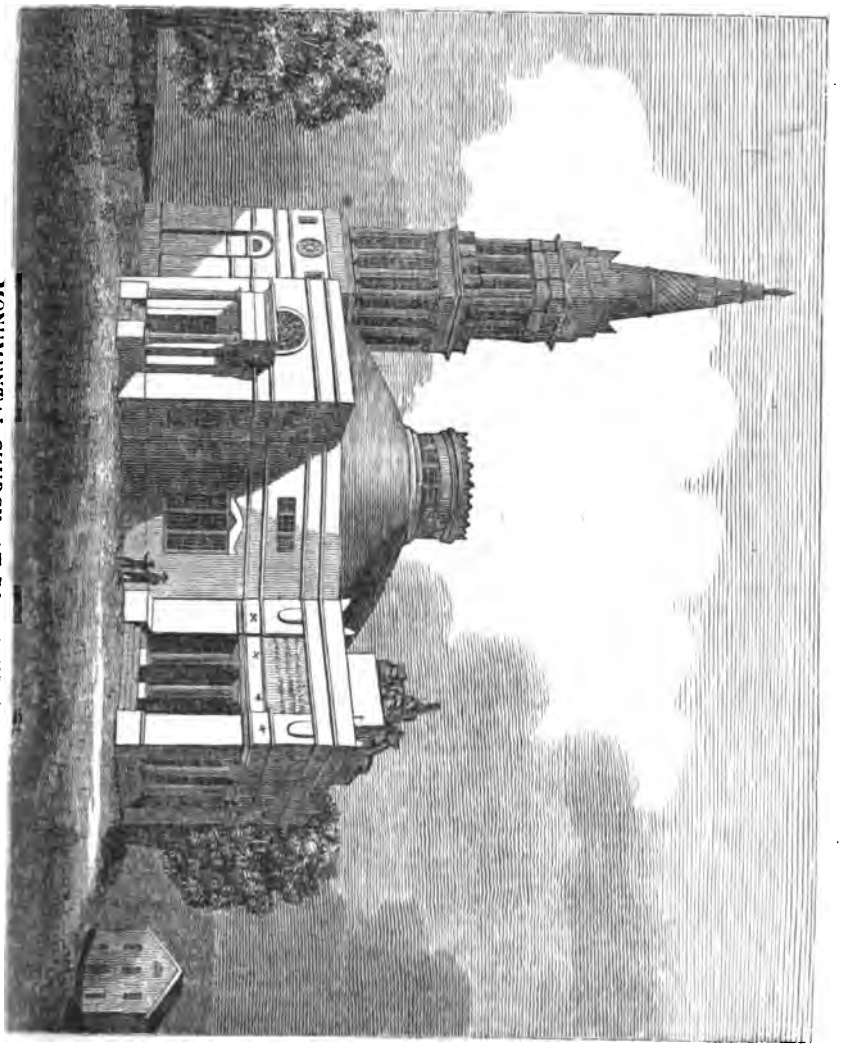
"In memory of the awful calamity, that by the providence of God fell on this city, on the night of the 26th of December, in the year of Christ, 1811; when, by the sudden and dreadful conflagration of the Richmond theatre, many citizens, of different ages, and of both sexes, distinguished for talents and for virtues, respected and beloved, perished in the flames; and, in one short moment, public joy and private happiness were changed into universal lamentation: this monument is erected, and the adjoining church dedicated to the worship of Almighty God, that, in all future times, the remembrance of this mournful event, on the spot where it happened, and where the remains of the sufferers are deposited, in one urn, may be united with acts of penitence and devotion."

The perspective view of the Monumental Church, from which the engraving presented is taken, was drawn by William Strickland, F. S. A. Isaac Sturtevant, of Boston, was the master builder.

An account of the burning of the Richmond Theatre will not, we trust, be considered out of place. It is compiled from the Rev. Timothy Alden's collection of American epitaphs and inscriptions, a rare and valuable work.

"On Thursday night, the 26th of December, 1811, it appears that the theatre on Shockoe hill, in Richmond, was attended by an unusual number of people. The pantomime, entitled *Agnes and Raymond, or the Bleeding Nun*, was to have closed the amusements of the evening. This had been translated for the occasion by Mr. Giradin; and many, who had seldom repaired to this place of recreation, now attended it in order to witness its performance, principally through civility to their fellow-citizen. In the first act of this afterpiece, one of the scenes exhibited the cottage of a robber, which was illuminated by a chandelier. When the curtain fell on the close of the first act, and before it rose for the second, this chandelier was raised aloft among the oil-painted scenery. By a fatal inattention, the lamp was not extinguished! The fire instantly caught, spread with rapidity, and, in less than five minutes, the whole roof, as well as the suspended combustible materials, was in a blaze. It burst through the bull's eye in front; it sought the windows where the rarefied vapor sought its passage, fed by the vast column of air in the hollows of the theatre, and by the inflammable panels and pillars of the boxes, by the dome of the pit, by the canvass ceiling of the lower boxes, until its suffocated victims in the front were wrapped in its devouring flame, or pressed to death under the smoking ruins of the building."

The imagination may better paint, than the pen of the writer describe, the unutterable anguish of the gay assembly. In one moment, hilarity and joy were exchanged for the most agonizing sorrow and distress, and a multitude of precious and immortal souls, at a time they little expected, were plunged into the world of spirits. Shrieks, groans, agony, and death, in its most terrific form, closed the tragic scene!



MONUMENTAL CHURCH, AT RICHMOND, VA.

TREATY OF WILLIAM PENN.

[See page 455.]

THIS compact, which, for its justice and benevolence, has conferred immortal honor upon the founder of Pennsylvania, was made under the wide-spreading branches of an elm-tree, that stood upon the bank of the Delaware at Shackamaxon. The stately tree was uprooted by a storm in 1810, when the trunk measured twenty-four feet in circumference, and its age was ascertained to be two hundred and eighty years, having been one hundred and fifty years old at the time the treaty took place. It was held in the highest veneration by the Indian nations, by the first settlers, and by their descendants. During the revolutionary war, in 1775, when the British army had possession of the district of country within Kingston Bay, and when firewood was very scarce, General Simcoe, who had command of the troops there, from a regard which he entertained for the character of William Penn, and the interest which he took in the history connected with the tree, ordered a guard of British soldiers to protect it from the axe. Many curious recollections belong to this venerated spot, and some of these are noticed in a memoir concerning the treaty, which may be seen by reference to the transactions of the Historical Society of Pennsylvania, carefully prepared by Mr. Roberts Vaux, whose correspondence with the late Judge Peters, Mrs. Deborah Logan, and the Rev. Dr. Collin, relating to the traditionary account of the *treaty*, was the means of bringing out much other instructive and entertaining matter worthy of perusal and preservation.

The Penn Society, in order to preserve a knowledge of the spot where the elm-tree stood, have caused a simple block of marble to be placed there, in the expectation, at some future day, of erecting a monument, altogether worthy of the event and the scene which are now more humbly commemorated in the manner that the annexed engraving represents.

The inscriptions on the stone are as follows:—

On the North.

TREATY GROUND OF WILLIAM PENN
AND THE INDIAN NATIVES, 1682.
UNBROKEN FAITH.

On the South.

WILLIAM PENN,
BORN 1644.
DIED 1718.

On the West.

PLACED BY THE PENN SOCIETY,
A. D. 1827, TO MARK THE SITE OF
THE GREAT ELM-TREE.

On the East.

PENNSYLVANIA FOUNDED,
1681,
BY DEEDS OF PEACE.

BRIDGE OF HIDE ROPES OVER THE RIVER LA PLATA.

[See page 457.]

LA PLATA is the name of a very great river in South America, running through the province of Paraguay; on which account the whole country is sometimes called Plata, though this name is usually given only to a part of Paraguay. In the latter sense it comprehends all that country which is bounded on the east and southeast by the Atlantic ocean; on the south by Terra Magellanica; on the west by Tucuman; and on the north by the provinces of Paraguay Proper and Parana. The great river La Plata, from which the country has its name, was first discovered in the year 1515, by Juan Diaz de Zolis, but denominated La Plata by Sebastian Cabot, from the quantity of precious metals he procured

MONUMENT OF THE GREAT TREATY OF PENN.

from the adjacent inhabitants, imagining that they were the produce of the country, though, in fact, they were brought from Peru.

The climate is pleasant and healthy. The winter is in May, June, and July, when the nights are very cold, but the days are moderately warm. The frost is neither violent nor lasting, and the snows are very inconsiderable. The country consists mostly of plains of a vast extent, and exceeding rich soil, producing all sorts of European and American fruits.

The river La Plata rises in Peru, and receives many others in its course, the chief of which is the Paraguay. The water of it is said to be very clear and sweet, and to petrify wood. It contains such plenty and variety of fish, that the people catch large quantities of them without any other instrument than their hands. It runs mostly to the south and southeast, and is navigable the greatest part of its course by the largest vessels, and is full of delightful islands. All along its banks are seen the most beautiful birds of all kinds; but it sometimes overflows the adjacent country to a great extent, and is infested with serpents of a prodigious size. From its junction with the Paraguay to its mouth, the distance is above two hundred leagues. Some judgment may be formed of its magnitude, when it is said that its mouth is about seventy leagues in width.

The manner in which individuals are conveyed across some parts of this majestic river is curious, and to those who are accustomed to bridges and boats, somewhat alarming. Of this subject, the following account is given by Mollien, in his travels in Colombia.

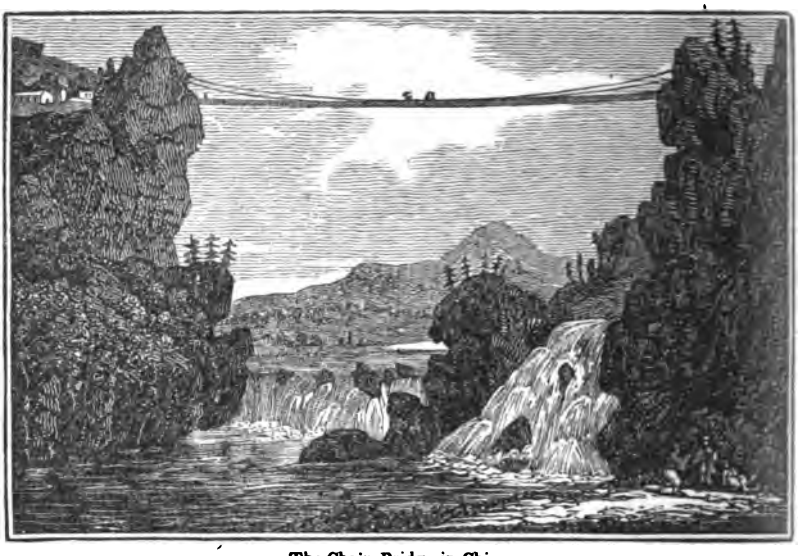
"The following day, leaving the banks of the Pai, I proceeded along those of the Rio de la Plata, which falls into it, and before two o'clock in the afternoon arrived in sight of the town of that name. We could not immediately enter it, on account of the bridge of communication not being sufficiently commodious for the number of persons going to and from La Plata. On each side of the river, leather bands are made fast to stakes driven into the ground; and upon this tarabita (for thus they call this singular sort of a bridge) is placed a piece of wood, furnished with leather straps, by which the traveller is fastened; and according to whichever side he wishes to go, he is drawn across. The passage, at first, seems rather alarming; and one cannot, without shuddering, find himself suspended over an abyss by a few hide ropes, which are very liable to be injured by the rain, and consequently to break. Accidents, however, seldom happen. Animals are made to swim across."

THE CHAIN BRIDGE IN CHINA.

WHETHER the Chinese are right in assigning to their portion of the world a much greater antiquity than we are willing to allow, may be fairly questioned; but certain it is, that in China many arts and sciences have been known at a period when the European nations were sunk in barbarity and ignorance. As one of the many proofs which might be adduced in support of this remark, we may mention that the Chinese were the first to construct chain or suspension bridges.

There is a famous bridge of this kind on the road to Yun Nan, in the province of Koei-Tcheou. It is thrown over a rapid torrent between two lofty mountains, and was constructed by a Chinese general, in the year 65 of the Christian era. At each end of the rocky mountain, a gate has been erected between two stone pillars, six or seven feet high, by seventeen or eighteen feet wide. Between these pillars four chains are suspended by large rings, and united transversely

BRIDGE OF HIDE ROPES OVER THE RIVER LA PLATA.



The Chain Bridge in China.

by smaller chains. Over these chains is a flooring of planks of timber, which are renewed as often as they become decayed. Other chain bridges have been constructed in China, in imitation of this; but none of them are either so large or have been so durable. To the very limited intercourse the Europeans are allowed in the interior of China, is to be attributed the circumstance that an invention which promises to be of such general utility as chain bridges, was not introduced into this country until upwards of eighteen centuries after it was known in China.

THE BRIDGES OF CHINA.

A GREAT number of canals traversing the cities and the country of China in all directions, render necessary a number of bridges, and these bridges are indeed as numerous as might be expected from an ingenious people exceedingly provident for their own convenience and comfort. From the amazing facilities afforded by the canals for transporting weighty burdens by water, these bridges do not require to be built of great strength, as every object of produce or manufacture can be wafted over on rafts or in bar[illegible]ral, indeed, only foot-passengers use the bridges, which are [illegible] of a light, but fanciful and elegant construction. The [illegible] or seven arches; the centre arch

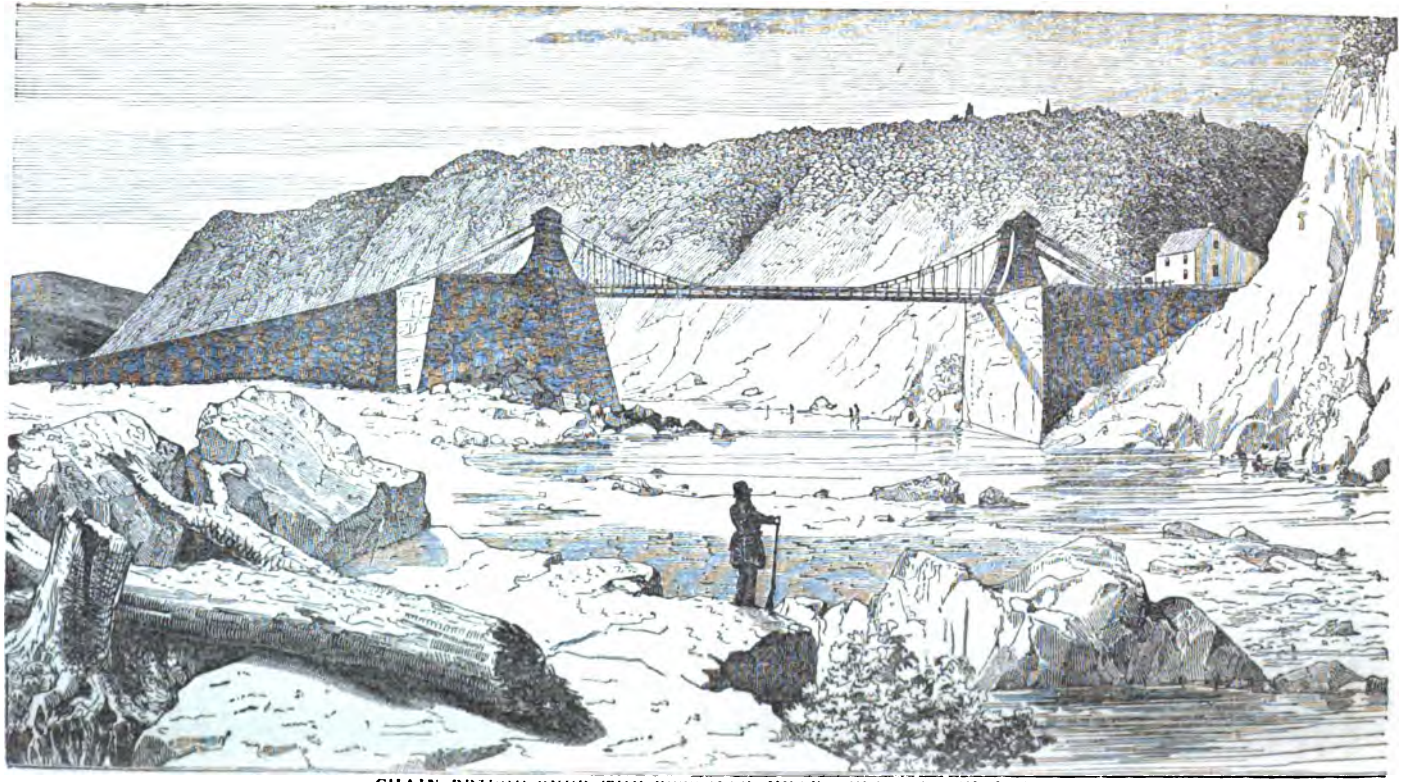
being frequently from thirty to forty-five feet wide, and sufficiently high to let vessels pass without striking their masts. Some of them stride across the canal with one bold lofty arch. The elevation of these bridges renders steps necessary. They resemble, in this respect, the old bridges of Venice, on which you ascend by steps on one side, and descend on the other in the same way. The engraving represents one of these bridges, and the reader will readily conceive the beautiful effect produced by a number of these light structures, succeeding each other at short distances, for miles and miles, where the canal runs in a straight line. Some of these bridges are of extraordinary beauty, and even magnificent. There is one near Pekin, built entirely of white marble, elaborately ornamented. Others are found over the canals of still greater magnificence, and with a grand triumphal arch at each end. And others again, instead of being composed of salient arches, are flat from one side of the canal to the other, stones, or marble flags of great length, being laid on piers so narrow and airy, that the bridge looks as if it were suspended in the air. It is a somewhat curious fact, that the Chinese censors have considered these numerous bridges as luxuries, and have more than once reproached the emperors for erecting them. A bridge, constructed in the eighth century, of iron and bronze, was one of the subjects of their reprehension, which fell very severely on an emperor of the dynasty of Souy, who built forty bridges, all in different styles of architecture, in the single city of Soe-Tcheou.

But these canal bridges are immeasurably surpassed in magnitude, and occasionally in beauty, by the bridges thrown across rivers, or long swamps, and places exposed to inundations. Some of the latter are of prodigious extent, and have triumphal arches on them, built of wood in the pagoda style, and splendidly painted.

CHAIN BRIDGE OVER THE POTOMAC.

[See page 460.]

Old *Patawomeck*, as they called it in the days of the illustrious Captain John, (and shame on us that it is not called so now,) after a long and broken course, flowing through one of the mildest and most beautiful countries in the world, from its source near the Back Bone, a spur of the Alleganies, and receiving the contributions of the Shenandoah and many other mountain streams, meets the tide water at the Little Falls, near the Chain Bridge above Georgetown, about three hundred miles from the Atlantic. From thence it soon swells into a broad expanse of water, navigable for the largest vessels of commerce. Within the view embraced by this picture, is the spot where, in June, 1608, Captain Smith, with an exploring party from Jamestown, landed. Two hundred and thirty years ago, a group of Englishmen may have filled the place where now stands the city sportsman; there are the same "mighty rocks, growing in some places above the growud as high as the shrubby trees, and divers other solid quarries of divers tinctures; and divers places where the waters had falne from the high mountaines they had left, a spagled skurfe, that made many bare places seem as guilded." Ill-starred Captain John! had it been thy fortune to explore this noble river at another season—hadst thine host at Nameraughquend but placed before thee that mystery of its waters, a *canvass-back*, or even his cousin-german, a *red neck*, thou wouldst have sworn allegiance to its shores for ever, and Jamestown had been abandoned, surely. On the hill of our Capitol might have waved the standard of King James, and who can tell but that thy coming



CHAIN BRIDGE OVER THE POTOMAC, NEAR GEORGETOWN, D. C.

nither in June, instead of November, may not have changed the destiny of a mighty nation? And who can tell how many a long speech that same nation has now to pay for and charge to account of that same little bird—the result of sleepless nights from over-eaten suppers, and dread of being sent no more to this its chosen rendezvous? Our aldermen and men of council should look well to this, and in their sage resolves forget not the presiding genius of their city. They should look more jealously upon the long guns that infest our river, for as surely as the canvass-back is driven from us, as surely will the "voice of the people" be heard no longer here; the high places of Washington become desolate, and the mighty swarms of great men, with bag and baggage, will settle on some other spot and build another capitol, "over the hills and far away."

The view itself tells us, that the bridge thrown over the river at the point of Little Falls, is a picturesque object. About ten miles above it are the Great Falls, where the vast volume of the Potomac, narrowing its channel to about one hundred yards wide, pitches perpendicularly thirty or forty feet into a hollow rock, then dashing through rocks it sweeps along for three or four miles, and again glides smoothly on its course until it reaches the rapids or Little Falls, where it has a gradual descent of about thirty-five or forty feet to tide water.

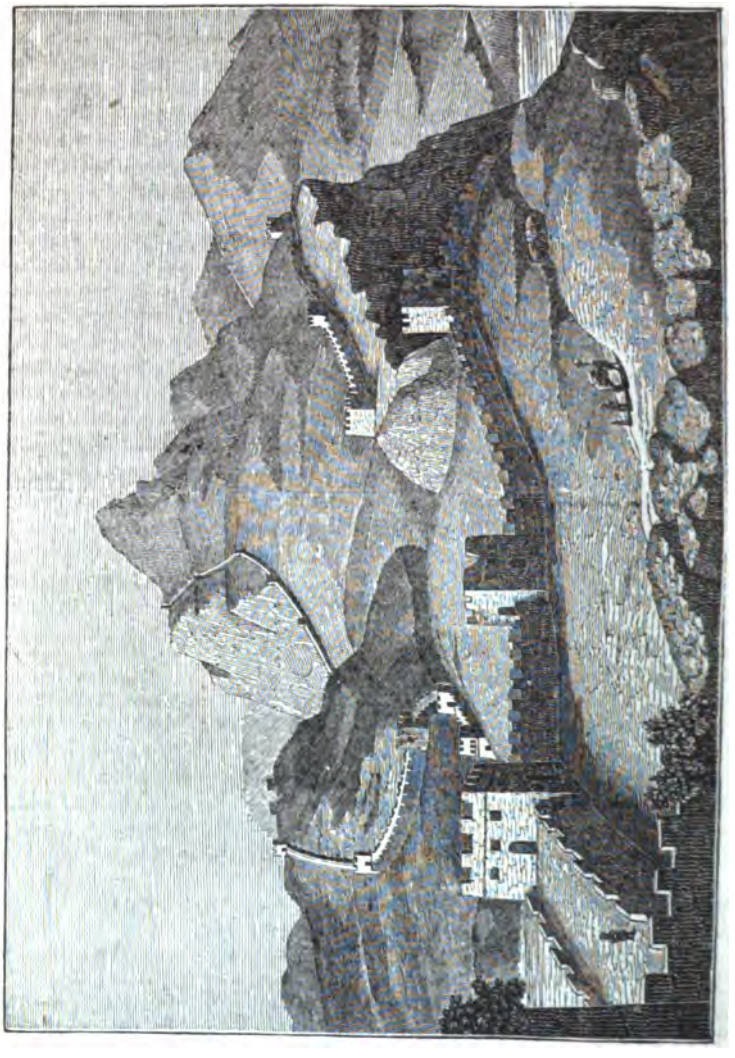
In the spring, when the ice that has accumulated in the river during the winter becomes dammed up at this point, with an immense quantity of drift timber that it has torn from the banks, one of the most exciting scenes is presented that can be imagined. At once the whole gives way with a tremendous crash, and the waters rush on and sweep everything in their course. More than one bridge has been thus carried away, and the fact will account for the peculiar construction of that in this picture.

THE GREAT WALL OF CHINA.

[See page 462.]

This stupendous wall, which extends across the northern boundary of the Chinese empire, is deservedly ranked among the grandest labors of art. It is conducted over the summits of high mountains, several of which have an elevation of not less than 5225 feet, (nearly a mile,) across deep valleys, and over wide rivers, by means of arches: in many parts it is doubled or trebled, to command important passes; and at the distance of nearly every hundred yards is a tower or massive bastion. Its extent is computed at fifteen hundred miles; but in some parts, where less danger is apprehended, it is not equally strong or complete, and towards the north-west, consists merely of a strong rampart of earth. Near Koopekoo it is twenty-five feet in height, and at the top about fifteen feet thick: some of the towers, which are square, are forty-eight feet high, and about forty feet in width. The stone employed in the foundations, angles, &c. is a strong gray granite; but the materials for the greater part consist of bluish bricks, and the mortar is remarkably pure and white.

The area of the construction of this great barrier, which has been and will continue to be the wonder and admiration of ages, is considered by Sir George Staunton as having been absolutely ascertained; and he asserts that it has existed for two thousand years. In this assertion he appears to have followed Du Halde, who informs us that "this prodigious work was constructed two hundred and fifteen years before the birth of Christ, by order of the first Emperor of the family of Tsin, to protect three large provinces from the eruptions of the Tartars." However, in the History of China, contained in his first volume,

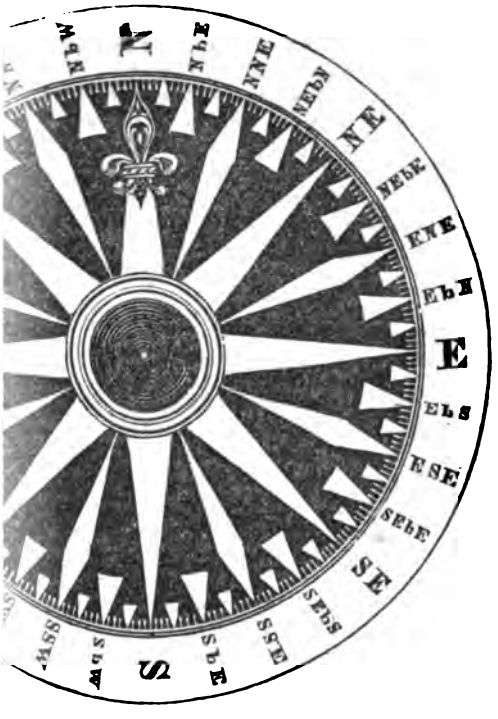


THE GREAT WALL OF CHINA.

second Emperor of the dynasty of Tsin, named immediately preceding the narrative of this con- re the birth of Christ. Hence suspicions may epoch when this work was undertaken, but also ecision of the Chinese annals in general. Mr. in China, and whose travels are deservedly es- ir information, assures us that this wall was built 60, by one of the Emperors, to prevent the fre- uls, whose numerous cavalry used to ravage the ape before an army could be assembled to oppose

---

MARINER'S COMPASS.



ass was invented about the year 1302. It had been , a species of iron ore, denominated the loadstone, had g iron, and of communicating the same property to rods sessed the still more remarkable property of spontane- nd south, when properly suspended, and of giving a edle of iron, so that, when suspended on a pivot, and to turn easily, one end of it would always point to the er to the south pole. This tendency of the magnetic larity. Having a compass, fitted up with such a needle,

the navigator is always able to tell which direction is north, and what course he is sailing, in the darkest night, as well as in daylight. A mass of iron in the immediate vicinity of the needle, would draw it from its natural position, and prevent it from always pointing to the north, and should, therefore, not be suffered to remain in such a situation.

The mariner's compass consists of a card or fly, on which the points of the compass are marked, to which the needle is attached in the direction of the north and south points, nicely balanced on a pivot in the centre of a circular box, so as to turn freely. The box is covered with glass, to protect the needle from accident; and is so hung as to maintain a uniformly horizontal position, whatever may be the rolling of the vessel.

The card, of which the foregoing diagram is an example, is divided into thirty-two points of the compass, the names of which are signified by the initial letters in the margin, as, N. for north; N. b. E. for north by east; the small b. signifying by, &c. The naming of these points of the compass in their order, beginning at north, and proceeding toward the east, and so on round the card to north again, and returning in a reversed order, is called by sailors, *boxing the compass;* and to be able to do it, is not only useful to seamen, but to children, who have occasion to use maps. They cannot tell, accurately, what direction one place is from another, unless they are familiarly acquainted with the points of the compass. The four points, north, south, east, and west, are called cardinal points. The card is thus divided into four equal parts. From N. to E. are eight points: from S. to E. are eight points: from N. to W., and from S. to W., are each eight points. Next to N., S., E., and W., the points N. W., S. W., N. E., and S. E., are the principal.

AN INDIAN GAZETTE.

[See page 465.]

Mr. Isaiah Thomas, in his "History of Printing in America," first published this curious plate, as taken many years since by a French officer. It relates to an expedition of Canadian warriors, who, soon after the settlement of this part of America, took up the hatchet against a hostile tribe that adhered to the English; and is a curious and interesting specimen of the descriptive and imaginative powers of these half-civilized Indians.

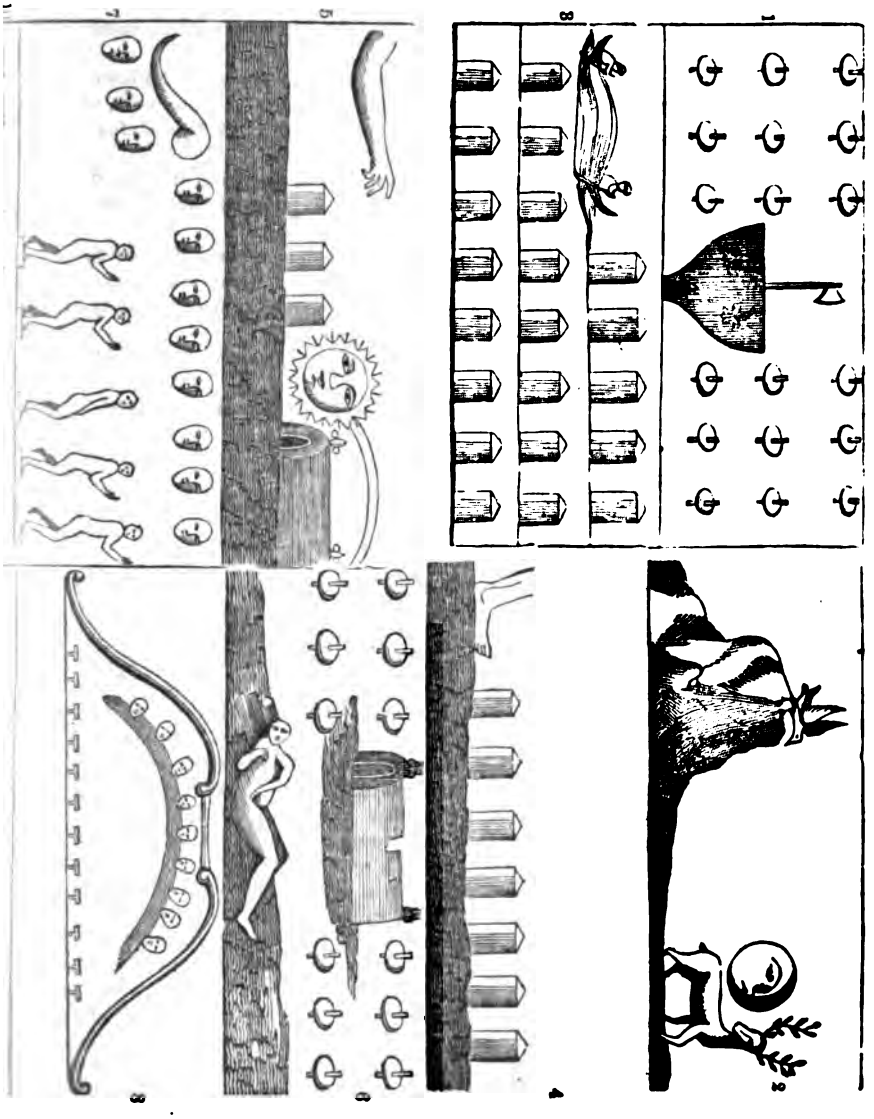
EXPLANATION.

This "Indian Gazette Extraordinary" consists of the following figures and emblematic signs cut out upon bark, and was divided into ten different compartments, or hieroglyphical paragraphs.

1. Each of the 18 figures represents the number 10, and appears to be somewhat like our 10, only that instead of the unit being *before* the cipher, it *runs through it*. There are eighteen of these figures, and they signify that 18 times 10, or 180 American Indians took up the hatchet, or declared war in favor of the French; which is represented by the hatchet placed over the arms of France.

2. They departed from Montreal, represented by the bird just taking wing from the top of a mountain. The moon and the buck show the time to have been in the first quarter of the buck-moon, answering to July.

3. They went by water, signified by the canoe. The number of huts, such as they raise to pass the night in, shows they were twenty-one days on their passage.



4. They went ashore, and travelled seven days by land, represented by the foot and the seven huts.

5. When they arrived near the habitations of their enemies, at sunrise, shown by the sun being to the eastward of them, beginning (as they think) its daily course. There they lay in wait three days, represented by the hand pointing, and by the three huts.

6. After which they surprised their enemies while asleep. The man asleep represents this; and the twelve figures, that there were 12 times 10, or 120; and the broken roof of the hut, that they broke into their habitations in that manner.

7. They killed with the club eleven of their enemies, indicated by the club and the eleven heads; and took five prisoners captive, shown by the doleful figures on the little pedestals.

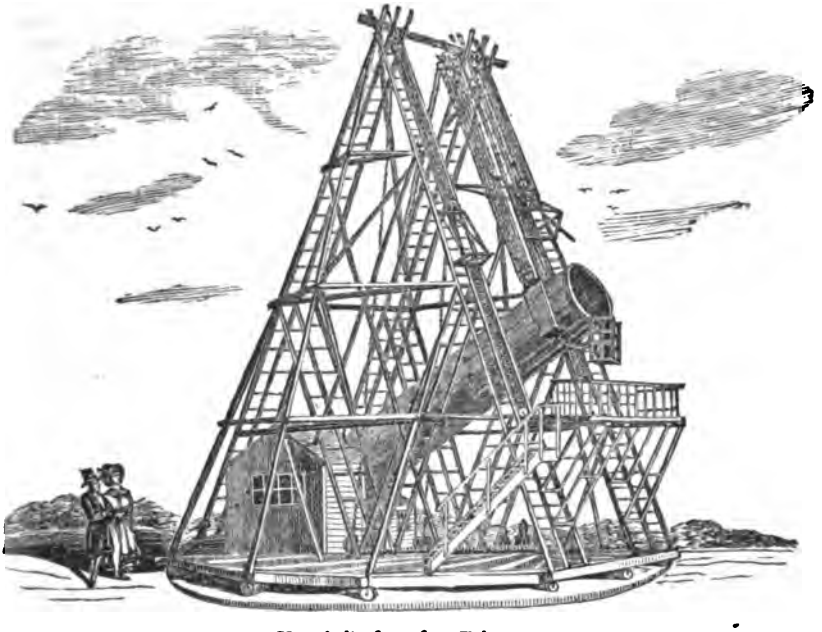
8. They lost nine of their own men in the action, represented by the nine heads within the bow, which is the emblem of honor among the American natives; but they had none taken prisoners (a circumstance to which they attach great honor), shown by all the pedestals being empty.

9. The heads of the arrows, pointing opposite ways, represent the battle, and the position of the contending parties.

10. The enemy fled; the heads of the arrows, all pointing one way, signify their flight.

THE TELESCOPE.

We might be apt to think, on a slight view of the matter, that there can be no immediate relation between the grinding and polishing of an optic glass, and fitting two or more of them in a tube, and the enlargement of our views of the operations of the eternal Mind. Yet the connexion between these two objects, and the dependance of the latter upon the former, can be fairly demonstrated. The son of a spectacle-maker of Middleburg in Holland, happening to amuse himself in his father's shop, by holding two glasses between his finger and his thumb, and varying their distance, perceived the weather-cock of the church-spire opposite to him much larger than ordinary, and apparently much nearer, and turned upside down. This new wonder exercised the amazement of the father; he adjusted two glasses on a board, rendering them moveable at pleasure; and thus formed the first rude imitation of a perspective glass, by which distant objects are brought near to view. Galileo, a philosopher of Tuscany, hearing of the invention, set his mind to work, in order to bring it to perfection. He fixed his glasses at the end of long organ pipes, and constructed a telescope, which he soon directed to different parts of the surrounding heavens. He discovered four moons revolving around the planet Jupiter—spots on the surface of the sun, and the rotation of that globe around its axis—mountains and valleys in the moon—and numbers of fixed stars where scarcely one was visible to the naked eye. These discoveries were made about the year 1610, a short time after the first invention of the telescope. Since that period this instrument has passed through various degrees of improvement, and by means of it, celestial wonders have been explored in the distant spaces of the universe, which, in former times, were altogether concealed from mortal view. By the help of telescopes, combined with the art of measuring the distances and magnitudes of the heavenly bodies, our views of the grandeur of the Almighty, of the plenitude of his power, and of the extent of his universal empire, are extended far



Herschel's forty feet Telescope.

beyond what could have been conceived in former ages. Our prospects of the range of the Divine operations are no longer confined within the limits of the world we inhabit;—we can now plainly perceive, that the kingdom of God is not only "an everlasting dominion," but that it extends through the unlimited regions of space, comprehending within its vast circumference thousands of suns, and ten thousands of worlds; all ranged in majestic order, at immense distances from one another, and all supported and governed "by Him who rides on the heaven of heavens," whose greatness is unsearchable, and whose understanding is infinite.

The telescope has also demonstrated to us the literal truth of those Scriptural declarations which assert that the stars are "innumerable." Before the invention of this instrument, not more than about a thousand stars could be perceived by the unassisted eye in the clearest night. But this invention has unfolded to view not only thousands, but hundreds of thousands and millions of those bright luminaries, which lie dispersed in every direction throughout the boundless dimensions of space. And the higher the magnifying powers of the telescope are, the more numerous those celestial orbs appear; leaving us no room to doubt, that countless myriads more lie hid in the distant regions of creation, far beyond the reach of the finest glasses that can be constructed by human skill, and which are known only to Him "who counts the number of the stars, and calls them by their names."

In short, the telescope may be considered as serving the purpose of a vehicle for conveying us to the distant regions of space. We would consider it as a wonderful achievement, could we transport ourselves two hundred thousand miles from the earth, in the direction of the moon, in order to take a nearer

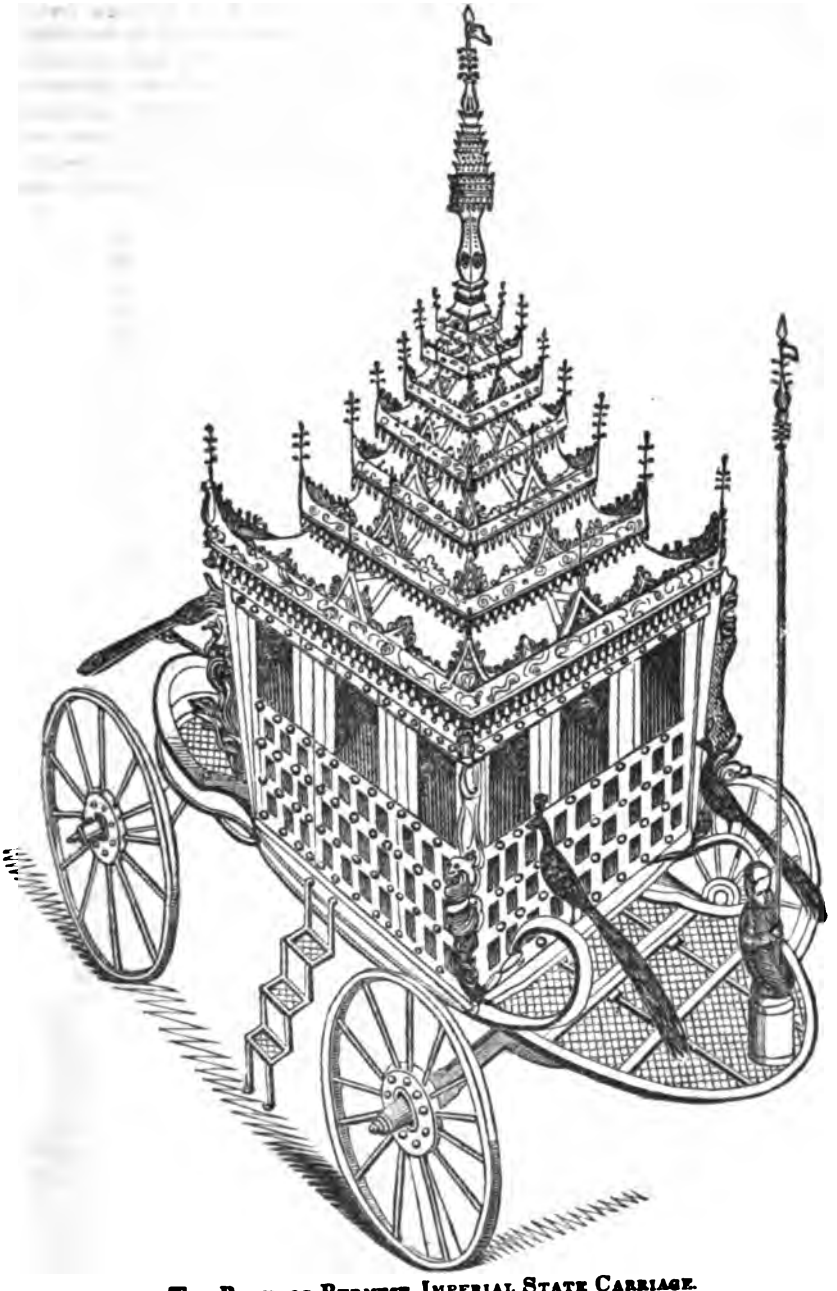
view of that celestial orb. But this instrument enables us to take a much nearer inspection of that planet, than if we had actually surmounted the force of gravitation, traversed the voids of space, and left the earth 230,000 miles behind us. For, supposing such a journey to be accomplished, we should still be ten thousand miles distant from the orb. But a telescope which magnifies objects 240 times, can carry our views within ONE thousand miles of the moon; and a telescope, such as Dr. Herschel's forty-feet reflector, which magnifies 6000 times, would enable us to view the mountains and vales of the moon, as if we were transported to a point about forty miles from her surface. We can view the magnificent system of the planet Saturn, by means of this instrument, as distinctly as if we had performed a journey of eight hundred millions of miles in the direction of that globe, which, at the rate of fifty miles an hour, would require a period of more than eighteen hundred years to accomplish. By the telescope, we can contemplate the region of the fixed stars, their arrangement into systems, and their immense numbers, with the same distinctness and amplitude of view, as if we had actually taken a flight of ten hundred thousand millions of miles into those unexplored and unexplorable regions, which could not be accomplished in several millions of years, though our motion were as rapid as a ball projected from a loaded cannon. We would justly consider it as a noble endowment for enabling us to take an extensive survey of the works of God, if we had the faculty of transporting ourselves to such immense distance from the sphere we now occupy; but, by means of the telescopic tube, we may take nearly the same ample views of the dominions of the Creator, without stirring a foot from the limits of our terrestrial abode. This instrument may therefore be considered as a providential gift, bestowed upon mankind to serve, in the mean time, as a *temporary substitute* for those powers of rapid flight with which the seraphim are endowed, and for those superior faculties of motion with which man himself may be invested, when he arrives at the summit of moral perfection.

THE RATH, OR BURMESE IMPERIAL STATE CARRIAGE.

[See page 469.]

BEFORE more minute description of this carriage, it may be remarked, that the eye is chiefly struck by the fretted golden roof, rising step by step from the square oblong body of the carriage, like an ascending pile of rich shrine-work. "It consists of seven stages, diminishing in the most skilful and beautiful proportions toward the top. The carving is highly beautiful, and the whole structure is set thick with stones and gems of considerable value. These add little to the effect when seen from below, but ascending the gallery of the hall, the spectator observes them, relieved by the yellow ground of the gilding, and sparkling beneath him like dew-drops in a field of cowslips. Their presence in so elevated a situation well serves to explain the accuracy of finish preserved throughout, even in the nicest and most minute portions of the work. Gilt metal bells, with large heart-shaped crystal drops attached to them, surround the lower stages of the pagoda, and, when the carriage is put in motion, emit a soft and pleasing sound." The apex of the roof is a pinnacle, called the *tee*, elevated on a pedestal. The *tee* is an emblem of royalty. It is formed of moveable belts, or coronals of gold, wherein are set large amethysts of a greenish or purple color; its summit is a small banner, or vane of crystal.

The length of the carriage itself is thirteen feet seven inches; or, if taken from the extremity of the pole, twenty-eight feet five inches. Its width is six



THE RATH, OR BURMESE IMPERIAL STATE CARRIAGE.

feet nine inches, and its height to the summit of the *tee* is nineteen feet two inches. The carriage body is five feet seven inches in length by four feet six inches in width, and its height, taken from the interior, is five feet eight inches. The four wheels are of uniform height, are remarkable for their lightness and elegance, and the peculiar mode by which the spokes are secured, and measure only four feet two inches: the spokes, richly silvered, are of very hard wood, called in the East *iron wood;* the felloes are cased in brass, and the caps to the naves elegantly designed of bell metal. The pole, also of iron wood, is heavy and massy; it was destined to be attached to elephants, by which the vehicle was intended to be drawn upon all grand or state occasions.

The extremity of the pole is surmounted by the head and fore part of a dragon, a figure of idolatrous worship in the East; this ornament is boldly executed, and richly gilt and ornamented, the scales being composed of a curiously colored *talc.* The other parts of the carriage are the wood of the oriental *sassafras* tree, which combines strength with lightness, and emits a grateful odor; and being hard and elastic, is easily worked, and peculiarly fitted for carving. The body of the carriage is composed of twelve panels, three on each face or front, and these are subdivided into small squares, of the clear and nearly transparent horn of the rhinoceros and buffalo, and other animals of eastern idolatry. These squares are set in broad gilt frames, studded at every angle with raised silvered glass mirrors: the higher part of these panels has a range of rich small looking-glasses, intended to reflect the gilding of the upper, or pagoda stages.

The whole body is set in or supported by four wreathed dragon-like figures, fantastically entwined to answer the purposes of pillars to the pagoda roof, and carved and ornamented in a style of vigor and correctness, that would do credit to a European design: the scaly or body part is of *talc*, and the eyes of pale ruby stones. The interior roof is latticed with small looking-glasses studded with mirrors as on the outside panels.

The upper part of each face of the body is composed of sash glasses, set in gilt frames, to draw up and let down after the European fashion, but without case or lining to protect the glass from fracture when down; the catches to secure them when up are simple and curious, and the strings of these glasses are woven crimson cotton. On the frames of the glasses is much writing in the Burmese character, but the language being utterly unknown in this

Enlarged View of the Tee, or Pinnacle.

country, cannot be deciphered; it is supposed to be adulatory sentences to the "golden monarch" seated within.

The body is stayed by braces of leather; the springs, which are of iron, richly gilt, differ not from the present fashionable C spring, and allow the carriage an easy and agreeable motion. The steps merely hook on to the outside: it is presumed they were destined to be carried by an attendant; they are light, and elegantly formed of gilt metal, with cane threads.

The Burmese are yet ignorant of that useful formation of the fore part of the carriage which enables those of European manufacture to be turned and directed with such facility: the fore part of that now under description does not admit of a lateral movement of more than four inches; it therefore requires a very extended space in order to bring it completely round.

On a gilt bar before the front of the body, with their heads toward the carriage, stand two Japanese peacocks, a bird which is held sacred by this superstitious people; their figure and plumage are so perfectly represented, as to convey the natural appearance of life; two others to correspond are perched on a bar behind. On the fore part of the frame of the carriage, mounted on a silvered pedestal, in a kneeling position, is the tee-bearer, a small carved image with a lofty golden wand in his hands, surmounted with a small tee, the emblem of sovereignty: he is richly dressed in green velvet, the front laced with jargoon diamonds, with a triple belt around the body, of blue sapphires, emeralds, and jargoon diamonds; his leggins are also embroidered with sapphires. In the front of his cap is a rich cluster of white sapphires encircled with a double star of rubies and emeralds: the cap is likewise thickly studded with the carbuncle, a stone little known to us, but in high estimation with the ancients. Behind the carriage are two figures; their lower limbs are tattooed, as is the custom with the Burmese: from their position, being on one knee, their hands raised and open, and their eyes directed as in the act of firing, they are supposed to have borne a representation of the carbine, or some such fire-arm weapon of defence, indicative of protection.

The pagoda or roof constitutes the most beautiful, and is, in short, the only *imposing* ornament of the carriage. The gilding is resplendent, and the design and carving of the rich borders which adorn each stage are no less admirable. These borders are studded with amethysts, emeralds, jargoon diamonds, garnets, hyacinths, rubies, tourmalines, and other precious gems, drops of amber and crystal being also interspersed. From every angle ascends a light spiral gilt ornament, enriched with crystals and emeralds.

This pagoda roofing, as well as that of the great imperial palace, and of the state war-boat or barge, bears an exact similitude to the chief sacred temple at Shoemadro.

This carriage was taken with the workmen who built it, and all their accounts. From these it appeared that it had been three years in building, that the gems were supplied from the king's treasury, or by contribution from the various states, and that the workmen were remunerated by the government. Independent of these items, the expenses were stated in the accounts to have been twenty-five thousand rupees (three thousand one hundred and twenty-five pounds.) The stones are not less in number than twenty thousand, which in reputed value at Tavoy, were a lac of rupees, twelve thousand five hundred pounds.

It was captured in the month of September, 1825, at Tavoy, a sea-port in the Burmese empire.

MANNERS, CUSTOMS, &c.

THE BEDOUINS.

The Bedouin Arabs, in general, are small, meager, and tawny; more so, however, in the heart of the desert than on the frontiers of the cultivated country; but they are always of a darker hue than the neighboring peasants. They also differ among themselves in the same camp; and M. Volney remarked, that the shaiks, that is, the rich, and their attendants, were always taller and more corpulent than the common class. He has seen some of them above five feet and six inches high; though in general they do not (he says) exceed five feet two inches. This difference can only be attributed to their food, with which the former are supplied more abundantly than the latter: and the effects of this are equally evident in the Arabian and Turkmen camels; for these latter, dwelling in countries rich in forage, are become a species more robust and fleshy than the former. It may likewise be affirmed, that the lower class of Bedouins live in a state of habitual wretchedness and famine. It will appear almost incredible to us, but

It is an undoubted fact, that the quantity of food usually consumed by the greatest part of them does not exceed six ounces a day. This abstinence is most remarkable among the tribes of the Najd and the Hedjaz. Six or seven dates soaked in melted butter, a little sweet milk or curds, serve a man a whole day; and he esteems himself happy when he can add a small quantity of coarse flour, or a little ball of rice. Meat is reserved for the greatest festivals; and they never kill a kid but for a marriage or a funeral. A few wealthy and generous sheiks alone can kill young camels, and eat baked rice with their victuals. In times of dearth, the vulgar, always half famished, do not disdain the most wretched kinds of food; and eat locusts, rats, lizards, and serpents, broiled on briers. Hence are they such plunderers of the cultivated lands and robbers on the high-roads; hence also their delicate constitution, and their diminutive and meager bodies, which are rather active than vigorous. It may be worth while to remark, that their evacuations of every kind, even perspiration, are extremely small; their blood is so destitute of serosity that nothing but the greatest heat can preserve its fluidity. This, however, does not prevent them from being tolerably healthy in other respects; for maladies are less frequent among them than among the inhabitants of the cultivated country.

The Bedouin Arabs are divided into tribes, which constitute so many distinct nations. Each of these tribes appropriates to itself a tract of land forming its domain; in this they do not differ from cultivating nations, except that their territory requires a greater extent, in order to furnish subsistence for their herds throughout the year. Each tribe is collected in one or more camps, which are dispersed through the country, and which make a successive progress over the whole, in proportion as it is exhausted by the cattle; hence it is, that within a great extent a few spots only are inhabited, which vary from one day to another; but as the entire space is necessary for the annual subsistence of the tribe, whoever encroaches on it is deemed a violator of property; this is with them the law of nations. If, therefore, a tribe, or any of its subjects, enter upon a foreign territory, they are treated as enemies and robbers, and a war breaks out. Now, as all the tribes have affinities with each other by alliances of blood or conventions, leagues are formed, which render these wars more or less general. The manner of proceeding on such occasions is very simple. The offence made known, they mount their horses and seek the enemy; when they meet, they enter into a parley, and the matter is frequently made up; if not, they attack either in small bodies, or man to man. They encounter each other at full speed with fixed lances, which they sometimes dart, notwithstanding their length, at the flying enemy; the victory is rarely contested; it is decided by the first shock, and the vanquished take to flight full gallop over the naked plain of the desert. Night generally favors their escape from the conqueror. The tribe which has lost the battle, strikes its tents, removes to a distance by forced marches, and seeks an asylum among its allies. The enemy, satisfied with their success, drive their herds farther on, and the fugitives soon after return to their former situation. But the slaughter made in these engagements frequently sows the seeds of hatred which perpetuate these dissensions. The interest of the common safety has for ages established a law among them, which decrees that the blood of every man who is slain, must be avenged by that of his murderer. This vengeance is called *Tar*, or retaliation; and the right of exacting it devolves on the nearest of kin to the deceased. So nice are the Arabs on this point of honor, that if any one neglects to seek his retaliation he is disgraced for ever. He therefore watches every opportunity of revenge; if his enemy perishes from any other cause, still he is not satisfied, and his vengeance is directed against the nearest relation. These animosities are trans-

mitted as an inheritance from father to children, and never cease but by the extinction of one of the families, unless they agree to sacrifice the criminal, or *purchase the blood* for a stated price, in money or in flocks. Without this satisfaction, there is neither peace nor truce, nor alliances between them, nor sometimes even between whole tribes : " *There is blood between us*," say they on every occasion ; and this expression is an insurmountable barrier. . Such accidents being necessarily numerous in a long course of time, the greater part of the tribes have ancient quarrels, and live in an habitual state of war ; which, added to their way of life, renders the Bedouins a military people, though they have made no great progress in war as an art.

Their camps are formed in a kind of irregular circle, composed of a single row of tents, with greater or less intervals. These tents, made of goat or camel's hair, are black or brown, in which they differ from those of the Turkmen, which are white. They are stretched on three or four pickets, only five or six feet high, which gives them a very flat appearance ; at a distance one of these camps seems only like a number of black spots ; but the piercing eye of the Bedouin

is not to be deceived. Each tent inhabited by a family is divided by a curtain into two apartments, one of which is appropriated to the women. The empty space within the large circle serves to fold their cattle every evening. They never have any intrenchments; their only advanced guards and patrols are dogs; their horses remain saddled and ready to mount on the first alarm; but as there is neither order nor regularity, these camps, always easy to surprise, afford no defence in case of an attack; accidents, therefore, very frequently happen, and cattle are carried off every day: a species of marauding war in which the Arabs are very experienced.

The tribes which live in the vicinity of the Turks are still more accustomed to attacks and alarms; for these strangers, arrogating to themselves, in right of conquest, the property of the whole country, treat the Arabs as rebel vassals, or as turbulent and dangerous enemies. On this principle, they never cease to wage secret or open war against them. Sometimes they contest with them a territory which they had let them, and at others demand a tribute which they never agreed to pay. Should a family of shaiks be divided by interest or ambition, they alternately succor each party, and conclude by the destruction of both. Frequently, too, they poison or assassinate those chiefs whose courage or abilities they dread, though they should even be their allies. The Arabs, on their side, regarding the Turks as usurpers and treacherous enemies, watch every opportunity to do them injury. Unfortunately, their vengeance falls oftener on the innocent than the guilty. The harmless peasant generally suffers for the offences of the soldier. On the slightest alarm, the Arabs cut their harvests, carry off their flocks, and intercept their communication and commerce. The peasants call them thieves, and with reason; but the Bedouins claim the right of war, and perhaps they also are not in the wrong. However this may be, these depredations occasion a misunderstanding between the Bedouins and the inhabitants of the cultivated country, which renders them mutual enemies.

We have placed at the top of the preceding page the costumes recommended for the adoption of travellers in their visits to the country around Mount Sinai. It resembles the dress of the natives of that region, and it is thought to be a protection from robbery, which is carried on very systematically by the Arabs.

THE KIRGHIZA COSSACKS.

[See pages 476, 477.]

Among the different Asiatic tribes which Russia has brought into subjection, either by force of arms or by political tact, there is no one which is more numerous, or which occupies a larger extent of country, than the tribe of the Kirghiza Cossacks. The immense uncultivated wild steppes where these people live, are bounded on the north by the desert of Siberia, west by the sea of Aral, and partly by the Caspian sea, south by the country of the Turcomans, the Kheivars and the Boukhares, and east by the fortified frontiers of the Chinese empire.

The Kirghiza Cossacks are divided into three hordes, called the great, the middle, and the small horde. All these hordes, however, do not acknowledge the power of Russia. The Kirghiza Cossacks have always been passionately fond of liberty, and have been brought into subjection partly by the Russians, and partly by the Chinese, only by internal discord, or by superiority of numbers. But if there is the least prospect of obtaining their freedom, they rise under the yoke and enjoy for a time their independence, to become again sub-

KIRGHIZA COSSACKS.

jected to their old or to new masters. Hence it is difficult to designate with certainty the number of Cossacks under the yoke of Russia, or the degree of influence exercised over them. We only know that most of the smaller and middle hordes belong nominally to Russia, and the great horde is partly under the dominion of the Chinese. It is also notorious that all the efforts of Russia to induce them to lead an agricultural life have been unsuccessful.

The manners and customs of all nomadian people are very similar. We always see in them the same mixture of simple barbarism, and the same energetic love of liberty, which in them frequently takes the place of civilization. The horse is the inseparable companion of the Kirghiza Cossacks. The flesh serves him for nourishment; his skin covers the tent which protects him from summer's heat and winter's cold. One event alone has an influence on the life of the Cossack: death seems to interrupt for a moment their wandering propensities, for although they have no houses nor cities, yet they have mausolea and cemeteries. They despise the arts of industry during life, but do homage to them at their last hours.

When a Kirghiza Cossack has breathed his last, all the females give themselves up to the extreme of despair. They groan, cry, tear their hair, beat their breasts and faces, and recite the virtues of him whose loss they mourn. This ceremony generally continues for a long time, and is frequently renewed every morning and evening for a year: the body is then represented by the trunk of a tree, upon which are placed the garments of the deceased. When the body is washed, dressed, and wrapped in a shroud, it is carried to the cemetery and laid in a grave, together with the arms of the deceased, and the saddle, bridle, &c., of his horse. Among some tribes the horse is killed and his flesh eaten, while the bones are mingled with the mortal remains of the Cossack.

Having bid a last adieu to the dead, the whole company sit down to an abundant repast; and a bluish flag is hoisted over the tent in token of mourning. The funeral respects are always at the expense of the parents or heirs, and must be proportional to the riches and rank of the deceased; otherwise the host exposes himself to the contempt of the guests. A traveller, Rubruquis, who was present at the funeral of the khan of the small horde, asserts that there were consumed two thousand five hundred sheep, two hundred horses, and more than five hundred measures of *koumis*, a fermented drink, made from fermented mare's milk.

The view of a cemetery of the Kirghiza Cossacks is very pleasing. Fatigued with the dull monotony of the steppes, the eye rests with pleasure on trees, pyramids, turrets, and other monuments of these cities of the dead. From one tomb the bow and arrows of the deceased are suspended; on another are a saddle and bridle; the tomb of a child is surmounted by a cradle. The habits of life or the age of the deceased is always indicated by some symbolical ornaments. A tree is generally planted over each tomb, and, if it thrives, the dead man is counted among the happy inhabitants of that paradise promised to the faithful by Mohammed.

These cemeteries, and the banks of some rivers, form the only ornament of these vast and melancholy countries. The ruins of great cities and of sumptuous palaces, however, prove clearly that this region was formerly inhabited by enlightened people, and that civilization has been banished from it. A merchant of Boukhara, distinguished for his science among all the people of this country, stated to a traveller that the borders of the river Syr David and of the sea of Aral were once so thickly populated, that a cat could go from Turkestan to Theiva without touching the ground, by leaping from one roof to another.

A HINDOO GRANDEE SMOKING.

THE HINDOOS.

[See page 479.]

THE Hindoos vie with the Chinese, in respect to the antiquity of their nation. Their institutions of religion form a complete system of superstition, upheld by everything which can excite the reverence of the people. The temples consecrated to their deities are magnificent; their religious ceremonies splendid; and the absolute dominion which the Brahmins have obtained over the minds of the people is supported by the command of the immense revenues with which the liberality of princes, and the zeal of pilgrims and devotees, have enriched their pagodas. The dominion of religion extends to a thousand particulars which, in other countries, are governed by the civil laws, or by taste, custom, and fashion. Their dress, their food, the common intercourses of life, their marriages, and professions, are all under the jurisdiction of religion. The food of the Hindoos is simple, consisting chiefly of rice, ghee, (a kind of imperfect butter,) milk, vegetables, and oriental spices. The warrior caste may eat of the flesh of goats, sheep, and poultry. Other superior castes may eat poultry and fish; but the inferior castes are prohibited from eating flesh or fish of any kind. Their greatest luxury consists in the use of the richest spiceries and perfumes, of which the great people are very lavish. They esteem milk the purest of food, because they think it partakes of some of the properties of the nectar of their gods, and because they esteem the cow itself almost as a divinity. Their manners are gentle. They are taught by their religion that matrimony is an indispensable duty in every man who does not entirely separate himself from the world from a principle of devotion; and, as none but male descendants can perform the obsequies to the manes of their ancestors, it is thought an irreparable calamity to die without male issue. Scarcely any state can be more degrading than that of Hindoo females. Till three years after the nuptial age, a girl is entirely at the disposal of her father. When married, she is immured in her husband's dwelling; her dependance upon him is perpetual and entire; she is not permitted to eat in his presence, and is considered not as a companion to aid him in enduring the evils of life, but as a slave to bear children, and be subservient to his rule. Polygamy is tolerated; but females, except among the Nairs, are not permitted to marry a second time. A husband can dismiss his wife at any time; but there is nothing that can dissolve the wife from her matrimonial engagement. The inhuman custom of women burning themselves on the funeral pile of their deceased husbands has, however, been recently prohibited in the presidencies of Fort William and Madras; and the progress of Christianity affords reason to hope for the speedy abolition of other revolting practices. The code of Gentoo laws, with their sacred books, the Veidam and the Shastah, are written in the Sanscrit language, which is very copious and nervous, although the style of their best authors is wonderfully concise. Hindoostan, towards the north, is pretty temperate, but hot towards the south; and it rains almost constantly for three months in the year. Its products are diamonds and other precious stones, silks, spices, aromatics, drugs, maize, rice, and sugar; and the chief manufactures, muslins and calicoes.

THE KOORDS.

THE habits of the Koords are those of other pastoral tribes in Asia. The mountains afford food for their flocks, in which their wealth mainly consists, and a secure abode for themselves and their families. They descend to the plains in early spring to cultivate the land, and in summer to reap the harvest. The products of the soil are various; the valleys are highly fruitful, and besides grain of various sorts, yield large crops of flax, cotton, tobacco, and manna, which is here the substitute for sugar.

But the grand distinguishing characteristic of the Koords, is their inordinate and determined spirit of plunder. With them plundering is a natural occupation; and every unhappy stranger, whom chance or curiosity throws in their way, they regard as their lawful prey. Should the unfortunate being happen to be poor and ragged, he is severely beaten for not having brought sufficient property to make him worth robbing. They are not only daring robbers, but skilful thieves; and their boldness is solely equalled by their address. Sir J. Malcolm, on his mission to the court of Persia in 1810, had scarcely set foot on their territory, when he was attacked, in spite of his imposing appearance, and his numerous attendants. Captain Keppel was closely watched for several miles, and narrowly escaped a similar visitation. Mr. Buckingham was less fortunate; a contribution of 2500 piastres (about 125*l.* sterling) was levied on the caravan by which he journeyed before it was allowed to proceed.

The authority of the chiefs of Koordistan is exercised with mildness, and obeyed with cheerfulness. Its enforcement is, in all cases, attended by an extreme regard to the national customs and prejudices. A remarkable instance of

this occurred when Sir John Malcolm visited Persia in 1810. "I was encamped," he says, "at a village called Zagha, situated within twenty-five miles of Sennah, the capital of Ardelan. The officer who attended as *mehmandar*, or entertainer to the mission, on the part of the Waly, informed me, that a man of the tribe of Soorsoor (some families of which were encamped within a mile) had, the day before, murdered his father. 'He will, of course, be put to death,' I observed. 'I do not think he will,' said the Mehmandar; 'he is himself heir, and there is no one to demand his blood.' 'Will not the prince of the country take care that this parricide does not escape?' 'The Waly,' he coolly replied 'cannot interfere in a case like this, unless appealed to; and, after all,' said he, 'if the affair be agitated, the murder will be compounded. Among Koords, who are always at war,' he added, 'the life of an active young man is much too valuable to be taken away on account of a dead old one!'"

There are several cities in Koordistan, but the military tribes of that country seldom congregate in large encampments. The prince of Ardelan lives in great luxury and splendor in his capital, whose inhabitants mostly appear to enjoy affluence. Their condition presents a striking contrast with that of the neighboring rude population, who glory in their wild freedom; and while they rejoice in the state and magnificence of the prince and chiefs to whom they owe hereditary allegiance, look down with pity and contempt on the less warlike, but more civilized community, by whom their rulers are immediately surrounded. Knowledge they have ever despised, and religion is scarcely known among them. They profess, indeed, the faith of Mohammed, but are, in general, as regardless of its substance as of its ceremonies. Sir John Malcolm found forty families of Nestorian Christians residing in Sennah, the heads of which, with their pastor, visited him. "There were," says the author of Sketches of Persia, "many of the same sect, the good priest informed us, in Koordistan, who had resided there ever since its separation from the Greek Church, a period of thirteen centuries; as for himself and his little flock, they had a small church at Sennah, and were, as their fathers had been, not only tolerated, but protected by the princes of Ardelan."

The costume of the Koords is picturesque in the extreme. The lively and varied colors of their dresses, composed of cloth, silks, and velvets, far exceed the sombre hues of the Persian cottons and sheep-skins. Their persons are equally striking, especially in the countenance, which has an originality and ferociousness of air quite characteristic. Their general appearance may be fairly estimated from the illustration prefixed to this article, which contains the portraits of three of them; the man with the spear in his hand was called *Okous*, "bull," on account of his strength.

MAHMOUD II.

[See page 483.]

THE destruction of the Janizaries will ever be considered as one of the most memorable events in the history of the reign of the Sultan Mahmoud II. The Janizaries were a famous military body; the name signifying, *new soldiers*; it was created by the Emperor Orcan, about the middle of the fourteenth century, and was regularly organized by his successor, Amurath I.

The corps of Janizaries, like that of the Egyptian Mamelukes, was at first recruited exclusively from young Christian captives; afterward, however, native born Turks were admitted. As the pay of the corps was large, and as it pos-

SULTAN MAHMOUD II.

sessed great advantages and exorbitant privileges, recruits were seldom wanted, and the corps was divided into those who were in actual service, and those who were called upon in case of war; the latter received no pay, but were entitled to all other privileges. At the time of its destruction, this body was composed of one hundred and ninety-seven *ortas* or legions, of one thousand men each.

Having contributed actively to the aggrandizement of the Turkish empire, the Janizaries, like most purely military bodies, the Prætorians of Rome, the Strelitz of Russia, and the Mamelukes of Egypt, became a formidable body; they made emperors and displaced them. Many sultans had attempted to destroy this dangerous institution, or to neutralize its influence by enrolling new troops. From the commencement of the eighteenth century, two emperors, Selim III. and Mustapha IV., had paid for their attempts, by the loss of throne and life. Mahmoud II., the cousin of one and brother of the other, who had obtained the imperial purple through a revolt, determined to accomplish this enterprise or to perish with them. For fifteen years he plotted against these Janizaries, who, being naturally enemies of all innovations, had remained stationary while all Europe was advancing in civilization.

Mahmoud, who by his conduct had gained the respect and affection of the Ottoman people, had already acquired the moral elements of success; and by organizing small troops of artillery, devoted to himself and hostile to the Janizaries, had also prepared the material for triumphing by force. At the end of May, 1826, it was determined in council that a military reform was necessary for the safety of the Ottoman race, and it was decided that the Janizaries should furnish their contingent of the new troops. At first, the military received this resolution with coldness, but when it was attempted to enforce the order, they mutinied, and on the 14th of June, in the evening, they were in full revolt. They ravaged Constantinople, pillaged and burned several of the public buildings, and the next day assembled on the square of the Atmeidan. The government, however, was ready; the most energetic measures were determined upon. The sacred standard of the Prophet was displayed at the mosque of Achmet, and every faithful Mussulman was commanded to take arms, and to rally under this banner. The sultan placed himself at the head of the male population of the capital, and the Janizaries were then summoned to come under the sacred standard. They refused; the mufti then declared that the law had ceased to protect them, and the sultan added that their lives were forfeited. They were now attacked by a furious people, and by the regular troops. The Janizaries presented no resistance; they stood as it were in a stupor, and perished by fire and sword. The gates of the city had been closed so that there was no escape. Several thousand persons were taken, some of whom were liberated, while those who were told to "*go and consult the mufti*," were strangled by the executioners. More than eight thousand Janizaries perished in Constantinople alone. A large number were executed in the provinces; many were banished to Asia, and the rest were disarmed and mingled with the population.

On the 17th of June, the body of Janizaries was dissolved by a decree: the term was declared infamous, and their memory was execrated. Thus perished, at one blow, a body of military, formidable for its power, and which had existed for more than four hundred years.

Mahmoud II. is the son of the emperor Abdul Hamid, who died in 1789; his mind is highly cultivated, and he speaks and writes with eloquence; his external appearance, however, is by no means remarkable, and the semi-European costume which he has adopted, deprives him of the advantage of the oriental dress; his manners, however, are affable, dignified, and sometimes imposing.

HAMET, THE PILOT OF LORD NELSON, AT THE BATTLE OF THE NILE.

[The above cut represents the costume of HAMET, the pilot of Lord Nelson at the battle of the Nile. The engraving is from an original drawing belonging to Commodore Perry, U. S. Navy.]

THE LAST OF THE MAMELUKES.

[See page 487.]

THE engraving is a portrait of the only survivor of the band of Mamelukes, that powerful corps who once exercised so much influence over the destinies of Egypt. A late traveller to the scene of their horrid massacre, gives us the following account of his visit:—

"Early in the morning of the 21st, we found the grooms with our horses in the court below, and after breakfast mounted for a visit of ceremony to the Abdi Effendi, the governor of the city. Having traversed the whole length of the city, we began, near its southern outskirts, to ascend, and presently found ourselves before the frowning walls of the citadel of Cairo. Here, in this strong eyry, well guarded by both nature and art, the pacha of Egypt has built his palace and gathered his treasures, and formed his arsenal for arms. The citadel stands on a spur from the range of Kebel Mokattam, the mountains that, stretching along on the east, help to form the valley of the Filo. Here they make a bend, and stretch off far to the eastward; and at the angle, on an irregular platform thrown off from it, the citadel was built, or at least enlarged to its present dimensions, in the twelfth century, by the famous Saladin. It is a place of great strength, and may be considered as the key of all the upper parts of Egypt. On passing the heavy exterior gateway, we found ourselves in the court where, twenty-five years ago, by order of Mohammed Ali, was perpetrated the bloody massacre of the Mamelukes. It is of irregular shape, with high walls on one side, and on the others steep ascents or precipices, surrounded by ramparts, above which again are heavy buildings, and among them the ruins of Saladin's palace. It was a place well chosen for such a butchery, and the whole plan of operations was strikingly characteristic of the man.

It will, perhaps, be recollected by the reader that the Mamelukes, as a distinct body, owed their origin to Saladin, who, distrusting his native troops, formed a body-guard of slaves, procured by purchase or capture from the countries bordering on the Caspian. They rose gradually under successive sultans, and all the fortresses at length being trusted to them, they concluded to turn the power to their own use, and through their beys became the governors of Egypt. Various, after this, were their changes of fortune; the hardy soldiers being generally successful in the field, but circumvented by their cunning adversaries in the council-room. The French found in them most obstinate and determined opposers; and when, at the close of this war, the British arms were triumphant, Lord Hutchinson demanded of the Sultan of Constantinople, to whom the country was yielded, restitution of the Mamelukes to their former privileges. He promised compliance, but had determined on the extinction of this race of dangerous subjects. The Turkish admiral, who was sent for this purpose, first enticed a great number of them to a pleasure excursion in boats off Aboukir, and his ships opening fire upon them, the greater portion were destroyed. War with their race being thus declared, Mohammed Ali, then first rising into notice, was sent with a force against them, but was defeated and compelled to retreat. This was the origin of the inveteracy of Mohammed Ali toward the Mamelukes.

On the invasion of Egypt by the English in 1807, the beys united with the rising pacha; but it was only a momentary truce; and the defeat of the English, giving him entire possession of Egypt, sealed at the same time the fate of his too trustful allies. He immediately formed a plan for the total destruction of the Mamelukes. His son Tousson was about this time preparing to lead an army against the Wahabees, and as this was a religious war, it was determined

THE LAST OF THE MAMELUKES.

to invest him with the command under circumstances of unusual splendor. The Mameluke beys were invited to the ceremony, which was to commence in the citadel. They came, led by their chief, Chahyn Bey; and a more splendid cavalcade never filed in through the portals of this fortress. They amounted to four hundred and seventy men on horseback, together with about an equal number of attendants of the same race on foot. Their reception was flattering. The pacha addressed them individually, and with a bland aspect and smiles welcomed them to the festivities. At length, it was necessary to form a procession, and the Mamelukes were honored by being put into a body near the head of it: they filed down and entered this rocky court; but when their whole body had gained it, the gates were suddenly shut both in front and rear, and they found themselves cruelly entrapped. The heights above were in a moment covered with the pacha's soldiers, and a deadly fire was poured down on them. Rage and execration were in vain: they were coolly shot down till not an individual remained alive. One of the beys escaped by spurring his horse up the steep outer wall; in the descent the animal was killed, but the rider was unhurt.

This was the end of the Mamelukes. On the following day the soldiers rushed into the city, and under the pretext of searching for more victims, plundered a large part of it before the pacha and his son durst venture out to suppress their fury.

Rev. G. Jones' Excursion.

DRESS OF THE MOOSLIM EGYPTIANS.

In general, the Mooslim Egyptians attain the height of about five feet eight or five feet nine inches. Most of the children under nine or ten years of age have spare limbs; but, as they grow up, their forms rapidly improve: in mature age, most of them are remarkably well proportioned; the men, muscular and robust; the women, very beautifully formed and plump; and neither sex is too fat. Corpulent persons are rarely seen among them, excepting a few in the metropolis and other towns, rendered so by a life of inactivity. In Cairo, and throughout the northern provinces, those who have not been much exposed to the sun have a yellowish, but very clear complexion, and soft skin; the rest are of a considerably darker and coarser complexion. The people of Middle Egypt are of a more tawny color, and those of the southern provinces are of a deep bronze or brown complexion—darkest toward Nubia, where the climate is hottest. In general, the countenance of the Mooslim Egyptian is of a fine oval form; the forehead, of moderate size, seldom high, but generally prominent: the eyes are deep sunk, black, and brilliant: the nose is straight, but rather thick: the mouth, well formed: the lips are rather full than otherwise: the teeth, particularly beautiful: the beard is commonly black and curly, but scanty. Very few individuals of this race have gray eyes; or rather, few persons supposed to be of this race; for those of this description are probably the offspring of Arab women by Turks or other foreigners. The Fellahheen, from constant exposure to the sun, have a habit of half-shutting their eyes: this is also characteristic of the Bedawees. Great numbers of the Egyptians are blind in one or both eyes. They generally shave that part of the cheek which is above the lower jaw, and likewise a small space under the lower lip, leaving, however, the hairs which grow in the middle under the mouth; or, instead of shaving these parts, they pluck out the hair. They also shave a part of the beard under the chin. Very few shave the rest of their beards, and none their

moustaches. The former they suffer to grow to the length of about a hand's breadth below the chin (such, at least, is the general rule, and such was the custom of the Prophet), and their moustaches they do not allow to become so long as to incommode them in eating and drinking. The practice of dyeing the beard is not common; for a gray beard is much respected. The Egyptians shave all the rest of the hair, or leave only a small tuft (called *shoosheh*) upon the crown of the head. This last custom (which is almost universal among them) probably originated in the fear that if the Mooslim should fall into the hands of an infidel, and be slain, the latter might cut off the head of his victim, and, finding no hair by which to hold it, put his impure hand into the mouth, in order to carry it; for the beard might not be sufficiently long. With the like view of avoiding impurity, the Egyptians observe other customs, which need not here be described. Many men of the lower orders, and some others, make blue marks upon their arms, and sometimes upon the hands and chest, as the women, in speaking of whom this operation will be described.

The dress of the men of the middle and higher classes consists of the following articles. First, a pair of full drawers (in Arabic, *libas*) of linen or cotton, tied round the body by a running string or band (called *dikkeh* or *tikkeh*), the ends of which are embroidered with colored silks, though concealed by the outer dress. The drawers descend a little below the knees, or to the ankles; but many of the Arabs will not wear long drawers, because prohibited by the Prophet. Next is worn a shirt (*ckamees*) with very full sleeves, reaching to the wrist: it is made of linen of a loose, open texture, or of cotton stuff, or of a mixture of silk and linen or cotton, in stripes, but all white. Over this, in winter, or in cool weather, most persons wear a *soodeyree*, which is a short vest of cloth, or of striped colored silk and cotton, without sleeves. Over the shirt and the soodeyree, or the former alone, is worn a long vest of striped silk and cotton (called *ckuftan*, or more commonly *ckooftan*), descending to the ankles with long sleeves extending a few inches beyond the fingers' ends, but divided from a point a little above the wrist, or about the middle of the forearm so that the hand is generally exposed, though it may be concealed by the sleeve when necessary; for it is customary to cover the hands in the presence of a person of high rank. Round this vest is wound the girdle (*khezam*), which is a colored shawl, or a long piece of high-figured muslin. The ordinary outer robe is a long cloth coat, of any color (called by the Turks *joobbeh*, but by the Egyptians *gibbeh*), the sleeves of which reach not quite to the wrist, as is seen by the foremost figure of the first cut. Some persons also wear a *beneesh* or *benish*; which is a robe of cloth with long sleeves like those of the ckooftan, but more ample, as is seen in the second figure of the same cut: it is, properly, a robe of ceremony, and should be worn over the other cloth coat; but many persons wear it instead of the gibbeh. The head-dress consists, first, of a small, close-fitting cotton cap (called *tackeeyeh*, or *arackeeyeh*), which is often changed; next, a *turboosh*, which is a red cloth cap, also fitting closely to the head, with a tassel of dark blue silk at the crown; lastly, a long piece of white muslin, generally figured, or a Cashmire shawl, which is wound round the turboosh. Thus is formed the turban, or *emameh*. The Cashmire shawl is seldom worn excepting in cool weather. Some persons wear two or three turbooshes, one over another. A *shereef* (or descendant of the Prophet) wears a green turban, or is privileged to do so; but no other person; and it is not common for any but a shereef to wear a bright green dress. Stockings are not in use; but some few persons, in cold weather, wear woollen or cotton socks. The shoes (*murkoob*) are of thick red morocco, pointed and turning up at the toes. Some persons also wear inner shoes (called *mezz*, or more properly, *mezd*),

Men of the Middle and Higher Classes.

of soft, yellow morocco, and with soles of the same: the murkoob are taken off on stepping upon a carpet or mat; but not the mezz: for this reason, the former are often worn turned down at the heel.

On the little finger of the right hand is worn a seal-ring, (*khatim*,) which is generally of silver, with a cornelian, or other stone, upon which is engraved the wearer's name: the name is accompanied by the words "his servant," (signifying "the servant, or worshipper of God,") and often by other words expressive of the person's trust in God, &c. The prophet disapproved of gold; therefore few Mooslims wear gold rings; but the women have various ornaments (rings, bracelets, &c.) of that precious metal. The seal-ring is used for signing letters and other writings; and its impression is considered more valid than the sign-manual. A little ink is dabbed upon it with one of the fingers, and it is pressed upon the paper—the person who uses it having first touched his tongue with another finger, and moistened the place in the paper which is to be stamped. Almost every person who can afford it has a seal-ring, even though he be a servant. The regular scribes, literary men, and many others, wear a silver, brass, or copper *dawayeh*, which is a case with receptacles for ink and pens, stuck in the girdle. Some have, in the place of this, or in addition to it, a case-knife, or a dagger.

The Egyptian generally takes his pipe with him wherever he goes, (unless it be to the mosque,) or has a servant to carry it, though it is not a common custom to smoke while riding or walking. The tobacco-purse he crams into his bosom, the ckooftan being large, and lapping over in front. A handkerchief, embroidered with colored silks and gold, neatly folded, is also placed in the bosom. Many persons of the middle orders, who wish to avoid being thought rich, conceal such a dress as we have described by a long black gown of cotton, similar to the gown worn by most persons of the lower classes.

Men of the Lower Classes.

The costume of the men of the lower orders is very simple. These, if not of the very poorest class, wear a pair of drawers, and a long and full shirt or gown of blue linen or cotton, or of brown woollen stuff, (the former called *'eree*, and the latter *zaaboot*,) open from the neck nearly to the waist, and having wide sleeves. Over this, some wear a white or red woollen girdle. Their turban is generally composed of a white, red, or yellow woollen shawl, or of a piece of coarse cotton or muslin, wound round a turboosh, under which is a white or brown felt cap, (called *libdeh*;) but many are so poor as to have no other cap than the libdeh—no turban, nor even drawers, nor shoes, but only the blue or brown shirt, or merely a few rags; while many, on the other hand, wear a soodeyree under the blue shirt; and some, particularly servants in the houses of great men, wear a white shirt, a soodeyree, and a ckooftan or gibbeh, or both, and the blue shirt over all. The full sleeves of this shirt are sometimes drawn up, by means of cords, which pass round each shoulder and cross behind, where they are tied in a knot. This custom is adopted by servants, (particularly grooms,) who have cords of crimson or dark blue silk for this purpose. In cold weather, many persons of the lower classes wear an 'abbayeh, like that before described, but coarser; and sometimes, instead of being black, having broad stripes, brown and white, or blue and white, but the latter rarely. Another kind of cloak, more full than the 'abbayeh, of black or deep blue woollen stuff, is also very commonly worn: it is called *diffeeyeh*. The shoes are of red or yellow morocco, or of sheepskin.

THE HOLLONTONTES.

To the southward of Mapoota there exists a tribe of warlike Caffers, called Zooloes, but by the Portuguese Vatwas. The people of Delagoa call them *Hollontontes*, doubtless a corruption of Hottentots, as they come from the south. A party of these natives visited the camp of Captain Owen, while he was occupied in exploring their coast. The following is a description of their young chief Chinchingany, which, with a few exceptions, will suffice for that of the whole tribe :—

Round his head, just above the eyes, was a band of fur, somewhat resembling in size and color a fox's tail neatly trimmed smooth; underneath this his black woolly hair was hidden; but above it grew to its usual length, until at the top, where a circular space was shaved in the manner of the monks and Zooloes; round this circle was a thick ring of twisted hide, fixed in its position by the curling over of the surrounding hair, which was altogether sufficiently thick to resist a considerable blow. On one side of his head was a single feather of some large bird as an emblem of his rank, and just above his eyebrows was a string of small white beads, and another across the nose; close under his chin he wore a quantity of long coarse hair, like the venerable beard of a patriarch hanging down on his breast; his ears had large slits in their lower lobes, and were made to fall three

or four inches, but without any ornaments; these holes in the ears are often used to carry articles of value. Each arm was encircled by a quantity of hair like that tied on his chin, the ends reaching below his elbows. Round his body were tied two strings, with twisted stripes of hide, with the hair on them much resembling monkeys' tails; the upper row was fastened close under his arms, and hung down about twelve inches, the end of each tail being cut with much precision and regularity; the lower row resembled the upper, and commenced exactly where the latter terminated, until they reached the knees. It bore altogether a great resemblance to the Scotch kilt. On his ankles and wrists he had brass rings or bangles. His shield was of bullock's hide, about five feet long and three and a half broad; down the middle was fixed a long stick, tufted with hair, by means of holes cut for the purpose, and projecting above and below beyond the shield about five inches. To this stick were attached his assagayes and spears; the only difference in these weapons is, that the former is narrow in the blade and small for throwing, the latter broad and long, with a stronger staff for the thrust.

The chief differed from his people only in the mock beard and feather, which they were not permitted to wear. In concluding the description of Chinchingany's costume, it is necessary to observe that this is entirely military, and used only when upon warlike expeditions; at other times, the Hollontontes are dressed as the Kaffers, with nothing but a small leathern or skin purse, not two inches in length, used as by the Delagoa tribes, or as their modesty dictates; the appearing without which, among some of the Kaffer tribes, is considered such an outrage upon decency, that the person witnessing it is justified in putting the offender to death. The feeling of shame thus appears to be increased in proportion as its seat is limited. These were fine negroes, tall, robust, and warlike in their persons, open, frank, and pleasing in their manners, with a certain appearance of independence in their carriage, infinitely above the natives with whom the party had hitherto communicated.

A CHINESE WEDDING.

[See page 494.]

SINGAPORE, *November 28th*, 1835.—Having been informed that a daughter of one of the principal Chinese merchants was about to be married, I solicited an invitation to attend and witness the ceremony. On arriving at the house of the bride's father, I was politely received by him, and invited to a seat in a room adjoining that in which the ceremonies were to take place, there to await the arrival of the bridegroom. As he did not arrive till nearly half an hour had elapsed, I improved my time in examining, with the father, the room where the daughter was to be married.

Before the door which led into the street was a screen. On the right hand of the door, in front of a window, stood a narrow table, elevated on a bench and some old bricks, and covered with fruits and sweetmeats, having two or three small wax candles burning on each end of it. Beyond this, toward the interior of the house, was a mat spread upon the brick floor, and still another smaller mat, of a finer quality and colors. On the side of the room opposite to the window and table above mentioned, was the family god, a large picture of a deified hero, and under it the family altar. This was fitted up for the occasion with a variety of showy ornaments, and sacrificial articles. Next to the wall was a screen about two feet square, formed of small square pieces of

CHINESE WEDDING.

marble, each having some painting upon it, set in a wooden frame. At each end of this stood a waxen candle about three feet high, and three inches in diameter at the lower end; these were already lighted. Near each of them were several curious articles, composed of various colored sweetmeats, fruits, &c., fixed on long sticks of wood and wire; and between them a still more curious object, which it would be difficult to describe. The body of it was composed of green leaves, several of which were rolled together, and then the rolls stitched together in the form of a pyramid. Into each roll of leaves was inserted a slender stick, some of which were covered with sweetmeats and dried fruits, and others with leaves and flowers. In the top of the pyramid of leaves, was a stick with numerous branches, covered with leaves, and flowers, and sparkling tinsel. These were but a part of the curious and gaudy ornaments on the altar. Between this altar and the carpet mentioned above, were set seven chairs, with cloth embroidered with gold-thread spread over them. One of these stood with its back toward the family god, and the others on the right and left in front of it. A table stood in the middle. The walls of the room were hung with papers bearing various inscriptions, some of which were expressive of good wishes toward the couple about to be married.

When I entered, there were several men in the room preparing for the wedding. At length, the word was given, "*Coming;*" on which a young friend of the parties put on a long light-colored silk garment over his usual dress, and the father asked if all was ready. Soon it was proclaimed again, "Coming;" and the young man put on a longer and larger garment of figured light green satin, reaching to his feet. Again they said "Coming," and he completed his dress by putting on a dark purple robe of figured satin, and a pyramidal cap with red hair fixed in the apex, and descending on all sides nearly to the rim. This person was the "receiver of guests."

The sound of music was now heard, and they prepared "to meet the bridegroom." He came in a procession preceded by music, dressed like the "receiver of guests," and attended by six companions, each bearing an immense umbrella, and other persons bearing poles of bamboo with branches and green leaves upon them, and sustaining between each pair a piece of red cloth about three yards long. On his arrival near the door, a kind of paper basket filled with Chinese crackers was carried out, and the crackers burned with great uproar. The receiver of guests met him at the door and performed the usual ceremony. As he entered the door, a nephew of the bride, splendidly dressed in embroidered satin, with much tinsel and a little gold, advanced and presented him an orange. The receiver of guests then conducted the bridegroom to the carpet already described, and placing him at one end, and himself at the other, they bowed to each other, and then by three measured long steps they exchanged places and bowed again; and then at last he conducted the bridegroom to his seat at the head of the table, and pretended to arrange the cloth for him. They here bowed to each other over it, then he went to receive others, leaving the bridegroom standing, and performed the same ceremonies with each of the six friends of the bridegroom; they then took their places, bowed, and sat down.

Tea was then brought, three cups in succession, and finally betel-nut. Soon after these were removed, my attention was drawn toward the interior of the house, where the bride made her appearance, splendidly dressed and veiled, and attended by several females. She advanced with downcast eyes, and a very slow step, designed doubtless to imitate that of the little-footed ladies of China. On coming to the threshold of the room, she paused, and waited without the motion of a muscle, or any expression of sentiment in her face, the

THE charact
udied in so m
ritten on this
oscow, and so
vilization ; bu
us.

The nobles of
side in the tw
lled *radically*
wn at court, a
venturers from
fact, the Russ
rozney, (I van
spitable and k
nsequences w
e will state the
d lately arrive
de, and not to
m accident or
found his ser

THE character and manners of the Russian people, which deserve to be studied in so many respects, are but little known. Most travellers who have written on this subject have formed their opinions from seeing St. Petersburgh, Moscow, and some other of the principal cities, which present much of European civilization; but there are parts of this vast empire which are yet truly barbarous.

The nobles of Russia are divided into two classes: the *Boiards*, who usually reside in the two capitals, are highly civilized; but those of them who are called *radically* Russians, and whose natural pride will not permit them to fawn at court, and solicit the honors and offices too frequently conferred on adventurers from different parts of Europe, live like satraps in their own chateaux. In fact, the Russians are now nearly the same as they were in the time of Iwan Grozney, (Ivan the Terrible,) that is, ignorant, superstitious, and fanatical; but hospitable and kind in rural life, and submitting to their state of slavery and its consequences with becoming resignation. As an instance of this last remark, we will state the following fact:—A Russian officer ordered his servant, who had lately arrived from the provinces, to hold his cloak during the military parade, and not to stir from the spot till he (the officer) had returned. Either from accident or necessity, the officer did not return for several hours; when he found his servant dead upon the snow, but with the cloak on his arm. This

A Milkmaid.

with a band of
dered with gol
stones. In the
peasant; and i
close of the ar

These costu
has published
ceremonies exc

The bullfig
he combats o
of the ancie
oint of view
ask and con

with a band of velvet, or with blue or amaranthine-colored silk, richly embroidered with gold or silver, and sometimes ornamented with pearls or precious stones. In the second picture, we have the costume of a milkmaid, or married peasant; and in the third, that of a married woman. The illustration at the close of the article represents a Russian priest in his characteristic dress.

These costumes ought now to be seen at St. Petersburgh; as the emperor has published a ukase, intimating to the ladies not to appear at court imperial ceremonies except in their national costumes.

A Russian Priest.

BULLFIGHTS.

[See page 500.]

The bullfights of Spain and Mexico are no less curious in their details, than the combats of men and animals which formerly took place in the amphitheatres of the ancients: and although they are now turned to account, in a political point of view, yet the circus is always crowded by females and males of every rank and condition.

SPANISH BULLFIGHT.

These contests have their rules and laws, like the modern duels between *gentlemen of honor*; they take place in different modes; the *toreadors*, or those who contend with the bull, are on horseback, or on foot; and are sometimes armed, and sometimes unarmed. In the former case, several cavaliers, armed with a long lance, are arranged in a line, one behind another, their eyes fixed on a gate at one entrance of the arena. The gate opens, and in rushes the bull, furious from his confinement, and from the tortures to which he is subjected: arrived in the arena, he stops, paws up the ground with his feet, lashes his tail, and rushes impetuously with his head downward upon the first cavalier. The latter, on seeing the approach of the bull, urges his horse into a gallop, and at the same time breaks his lance from behind forward in the neck of the bull. The animal, smarting from the wound, and enraged at missing his blow, then proceeds to the next cavalier, who is immediately attacked; imitating the example of his comrade, the unfortunate animal receives from him a second wound. This unequal contest continues until the bull, exhausted by pain and loss of blood, falls dead on the arena. Sometimes, however, the result is different: and if the cavalier commit the slightest error at the critical moment, his horse is overthrown by the horn of the animal; and then, instigated by the fear of losing his reputation and honor, the discomfited cavalier contends with the animal on foot and kills him. During this contest, the spectators watch every motion of the combatants, and give those credit, to whom credit is due. "*Bravo, bull!*" and "*Bravo, cavalier!*" resound from all parts of the amphitheatre.

When the toreador is on foot, the chances seem more equal: in this case the man is armed with a sword, and holds in his hand a staff to which a small red flag is attached: the bull, on seeing the red flag, throws himself upon it and not on the man, and the toreador might easily finish the contest by plunging his steel into the throat of the animal; but to show that he has no fears in regard to continuing the contest, he again takes his position in front of the animal and provokes him with the flag, and the fight is not terminated till after several successive attacks. Sometimes the toreador does not allow the bull to waste his strength with impunity on the banner, but, catching his opportunity, places one foot upon the neck of the animal, as he bends his head down previous to an attack, and jumps over him, a feat which is greatly applauded by the spectators. Most frequently the bull continues the game as long as is desired, but sometimes, finding his efforts useless, refuses to engage: in this case, neither the provocations and insults of the toreador, nor the bitter clamors of the speculators, can disturb the peaceable resolution of the animal. But his fate is only hastened: for when all efforts to inspire the bull with courage fail, the irritated populace pronounce his decree; and cries of "*Death! death!*" are heard on all sides. The sentence is soon executed; the toreador, after bowing respectfully to the galleries, plunges his sword into the bull's throat, who stands for a moment, and then falls dead.

Sometimes the toreadors contend unarmed: in this case, about a dozen of them fall upon the animal on all sides, and taking hold of his horns, legs, and tail, pull him to the ground. This, however, is dangerous sport, and the assailants rarely escape without severe injuries. There are several other forms of contests: we shall only mention that where the battle is between a bull and a single toreador, who, however, is provided with a cask in which he takes refuge on the approach of the bull, who strikes it with his horn, raises it in the air, and rolls it before him. One stab with a short sword in the heart of the animal terminates the contest, when the public are satisfied with this amusement

Sometimes balls of wood are attached to the horns of the bull, and the lances of the toreadors in this case have no points. For these harmless amusements,

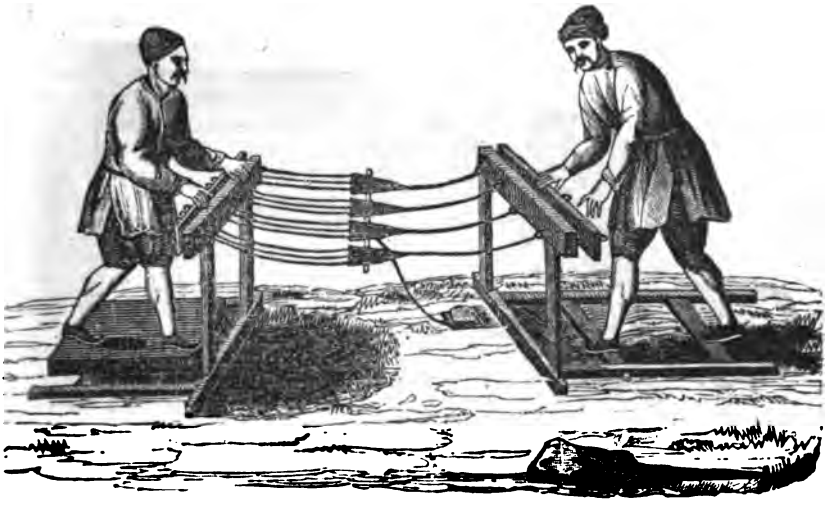
however, the populace have no taste. They are satisfied only with blood. At the annual bullfights, the sports are not complete till a dozen bulls have perished, and perhaps some heroes and toreadors. On these occasions, every place in the vast amphitheatres, which are built to accommodate several thousands, is occupied.

MADAGASCAR.

Among the many avenues which American enterprise has opened for American manufactures, the island of Madagascar deserves attention. Here, our countrymen have established shops, in which they keep a variety of goods, which are given in exchange for the different articles brought in by the natives. Here, too, they have erected large slaughter-houses, in which bullocks are killed, and the beef packed and prepared for shipping.

The engraving represents a native of Madagascar in the costume of his country. His dress consists of a large white garment of native manufacture, ornamented with seven black streaks near the edges, and one across the middle; this is secured round the waist, a small part hanging down and forming a sort of hilt, while the rest is thrown gracefully over the shoulders. Round the neck is suspended a string of beads, and drops of cut glass of various sizes and colors. On the wrists are bungles of silver, and the long black hair is plaited into small tails, with a knot at the end. These are trimmed so as not to hang below an imaginary line above the eyebrow and across the ear; while from one in the centre of the forehead is suspended a circular piece of neatly turned ivory, about an inch and a half in diameter.

CHINESE ROPE-MAKING.



In China they twist together long filaments of bamboo; and this material for ropes is preferred to hemp.

The above engraving is designed to represent the Chinese manner of making ropes. It bears considerable resemblance to our own method. Their cables and other large ropes, however, the Chinese spin vertically. The workmen are mounted on a high scaffold, and the rope descends, as fast as it is made, and is immersed in a liquor which renders it more strong and elastic.

CHINESE BOOKSELLER.

[See page 504.]

The almost infinite number of characters in the Chinese language (of which there are 80,000) renders the study of their literature extremely difficult: hence literary acquirements in that country are considered as indicating great intellectual capacity, and all those devoted to belles-lettres are regarded with marked respect. This esteem is extended to those who are in any manner connected with literature: not only the booksellers and printers, but even the manufacturers of paper and ink, are regarded with more respect than other artisans.

This state of things, however, is not without its disadvantages: the bookseller in China is more hampered with restrictions than in other countries; for the printer cannot put a book to press, unless it has previously been approved by the imperial censors: and even after it has been printed, if a mandarin find the book to be a bad one, the edition can be confiscated, and the printer and editor bastinaded.

Typography was well known in China before its discovery in Europe, but it has made little progress. The manner in which impressions are taken is very

CHINESE BOOKSELLER.

simple, and resembles engraving. The manuscripts are copied in raised characters on blocks of wood; the block is then coated with a layer of what is termed Chinese ink, and a sheet of paper is pressed gently against the prominent characters. As this paper, however, is made of the inner bark of bamboo, of cotton-wood, or of the mulberry tree, an impression can only be taken on one side. Upon each sheet are two pages of characters, and the sheet is then folded so that the blank sides are together.

The Chinese binder, unlike those in our own country, attaches the loose edges of the sheet to the back of the book. In these books the lines are not written horizontally from left to right as in our books, nor from right to left as in Hebrew works, but perpendicularly from above downward, commencing on the right. The books are generally covered with a sheet of colored paper; sometimes, however, they are bound in silk, embroidered with silver or gold.

The Chinese bookseller, as represented in our engraving, has no store, but carries his books about with him.

The Chinese do not write with pens, but with sable pencils. Their escritoire is made of a piece of polished marble, in the ends of which are holes for the cakes of ink, and for water: the cake of ink is moistened and rubbed against the marble until it becomes liquid and fit for use. The brush, ink, paper, and marble are designated by a simple word which signifies the *four precious things*.

INDIAN JUGGLERS EXHIBITING TAMED SNAKES.

[See page 506.]

THERE are several passages in Scripture which allude to the commonly received opinion in the East, that serpents are capable of being rendered docile, or at least harmless, by certain charms or incantations. The most remarkable of these texts is that of the 58th Psalm, where the wicked are compared to "the deaf adder that stoppeth her ear, which will not hearken to the voice of charmers, charming never so wisely;" and that of the 8th chap. of Jeremiah: "I will send serpents and cockatrices among you, which will not be charmed." Dr. Shaw says, that a belief that venomous serpents might be rendered innoxious by songs or muttered words, or by writing sentences or combinations of numbers upon scrolls of paper, prevailed through all those parts of Barbary where he travelled. In India, at the present day, the serpent-charmers are a well-known division of the numerous caste of jugglers that are found in every district. Mr. Forbes, in his "Oriental Memoirs," appears to attach some credit to their powers of alluring the *Cobra-di-Capello* and other snakes from their hiding-places, by the attraction of music. Mr. Johnson, however, in his "Sketches of India Field Sports," says, "The professed snake-catchers in India are a low cast of Hindoos, wonderfully clever in catching snakes, as well as in practising the art of legerdemain: they pretend to draw them from their holes by a song, and by an instrument somewhat resembling an Irish bagpipe, on which they play a plaintive tune. The truth is, this is all done to deceive. If ever a snake comes out of a hole at the sound of their music, you may be certain that it is a tame one, trained to it, deprived of its venomous teeth, and put there for the purpose; and this you may prove, as I have often done, by killing the snake, and examining it, by which you will exasperate the men exceedingly."

The account of Mr. Johnson certainly appears the more probable version of this extraordinary story; yet enough remains to surprise, in the wonderful com-

Jupiter Jupiter, Sculptor, Tagus Series.

mand which these people possess over the reptiles that they have deprived of their power of injury, and taught to erect themselves, and make a gentle undulating movement of the head, at certain modulated sounds. The jugglers are very expert in the exercise of the first branch of the trade, that of catching the snakes. They discover the hole of the reptile with great ease and certainty, and digging into it, seize the animal by the tail with the left hand, and draw the body through the other hand with extreme rapidity, till the finger and thumb are brought up to the head. The poisonous fangs are then removed, and the creature has to commence its mysterious course of instruction. According to Mr. Johnson, however, the business of the snake-charmer is a somewhat perilous one. In catching the reptiles, they are generally provided with a hot iron to sear the flesh, should they be bitten; and the following anecdote, given by Mr. Johnson, would show that the danger is not completely avoided, even when the venomous fangs are removed.—"A man exhibited one of his dancing *cobra-di-capellos* before a large party. A boy about sixteen years old was teasing the animal to make it bite him, which it actually did, and to some purpose, for in an hour after he died of the bite. The father of the boy was astonished, and protested that it could not be from the bite; that the snake had no venomous teeth; and that he and the boy had often been bitten by it before, without any bad effect. On examining the snake, it was found that the former fangs were replaced by new ones, not then far out of the jaw, but sufficient to bite the boy. The old man said that he never saw or heard of such a circumstance before."

MANNERS OF THE NORTHERN INDIANS.

BY THE WIFE OF AN EMIGRANT.

This is the fishing season. Our lakes are famous for masquinongé, salmon-trout, white-fish, black-bass, and many others. We often see the lighted canoes of the fishermen pass and repass of a dark night before our door. The darker the night, and the calmer the water, the better it is for the fishing.

It is a very pretty sight to see these little barks slowly stealing from some cove of the dark pine-clad shores, and manœuvring among the islands on the lakes, rendered visible in the darkness by the blaze of light cast on the water from the jack—a sort of open grated iron basket, fixed to a long pole at the bows of the skiff or canoe. This is filled with a very combustible substance, called fat pine, which burns with a fierce and rapid flame, or else with rolls of birch-bark, which is also very easily ignited.

The light from above renders objects distinctly visible below the surface of the water. One person stands up in the middle of the boat with his fish-spear —a sort of iron trident, ready to strike at the fish that he may chance to see gliding in the still waters, while another with his paddle steers the canoe cautiously along. This sport requires a quick eye, a steady hand, and great caution in those that pursue it.

I delight in watching these torch-lighted canoes so quietly gliding over the calm waters, which are illuminated for yards with a bright track of light, by which we may distinctly perceive the figure of the spearsman standing in the centre of the boat, first glancing to one side, then the other, or poising his weapon ready for a blow. When four or five of these lighted vessels are seen at once on the fishing-ground, the effect is striking and splendid.

Bear Hunting by the Chippewa Indians.

The Indians are very expert in this kind of fishing; the squaws paddling the canoes with admirable skill and dexterity. There is another mode of fishing in which these people also excel: this is fishing on the ice when the lakes are frozen over—a sport that requires the exercise of great patience. The Indian, provided with his tomahawk, with which he makes an opening in the ice, a spear, his blanket, and a decoy-fish of wood, proceeds to the place he has fixed upon. Having cut a hole in the ice, he places himself on his hands and knees, and casts his blanket over him, so as to darken the water and conceal himself from observation; in this position he will remain for hours, patiently watching the approach of prey, which he strikes with admirable precision as soon as it appears within the reach of his spear.

The masquinongé thus caught are superior in flavor to those taken later in the season, and may be bought very reasonably from the Indians. I gave a small loaf of bread for a fish weighing from eighteen to twenty pounds. The masquinongé is to all appearance a large species of the pike, and possesses the ravenous propensities of that fish.

As soon as the ice breaks up, our lakes are visited by innumerable flights of wild-fowl; some of the ducks are extremely beautiful in their plumage, and are very fine-flavored. I love to watch these pretty creatures floating so tranquilly on the water, or suddenly rising and skimming along the edge of the pine-fringed shores, to drop again on the surface, and then remain stationary, like a little fleet at anchor. Sometimes we see an old duck lead out a brood of little ones from among the rushes; the innocent, soft things look very pretty, sailing round their mother; but at the least appearance of danger, they disappear instantly by diving. The frogs are great enemies to the young broods; they are also the prey of the masquinongé, and, I believe, of other large fish that abound in these waters.

The Indians are very successful in their duck-shooting; they fill a canoe with green boughs, so that it resembles a sort of floating island; beneath the cover of these boughs they remain concealed, and are enabled by this device to approach much nearer than they otherwise could do to the wary birds. The same plan is often adopted by our own sportsmen with great success.

A family of Indians have pitched their tents very near us. On one of the islands in our lake we can distinguish the thin blue smoke of their wood fires, rising among the trees, from our front window, or curling over the bosom of the waters.

The squaws have been several times to see me; sometimes from curiosity, sometimes with the view of bartering their baskets, mats, ducks, or venison, for pork, flour, potatoes, or articles of wearing apparel. Sometimes their object is to borrow "kettle to cook," which they are very punctual in returning.

Once a squaw came to borrow a washing-tub, but not understanding her language, I could not for some time discover the object of her solicitude; at last she took up a corner of her blanket, and, pointing to some soap, began rubbing it between her hands, imitated the action of washing, then laughed, and pointed to a tub; she then held up two fingers, to intimate it was for two days she needed the loan.

These people appear of gentle and amiable dispositions; and, so far as our experience goes, they are very honest. Once, indeed, the old hunter, Peter, obtained from me some bread, for which he promised to give a pair of ducks, but when the time came for payment, and I demanded my ducks, he looked gloomy, and replied with characteristic brevity, "No duck—Chippewa (meaning S——, this being the name they have affectionately given him) gone up lake with canoe—no canoe—duck by-and-by." By-and-by is a favorite expression of the

Indians, signifying an indefinite point of time; may be it means to-morrow, or a week, or month, or it may be a year or even more. They rarely give you a direct promise.

As it is not wise to let any one cheat you, if you can prevent it, I coldly declined any further overtures to bartering with the Indians until my ducks made their appearance.

Some time afterward I received one duck by the hands of Maquin, a sort of Indian Flibberty-gibbet; this lad is a hunchbacked dwarf, very shrewd, but a perfect imp; his delight seems to be in tormenting the brown babies in the wigwam, or teasing the meek deer-hounds. He speaks English very fluently, and writes tolerably for an Indian boy; he usually accompanies the women in their visits, and acts as their interpreter, grinning with mischievous glee at his mother's bad English and my perplexity at not being able to understand her signs. In spite of his extreme deformity, he seemed to possess no inconsiderable share of vanity, gazing with great satisfaction at his face in the looking-glass. When I asked his name, he replied, "Indian name Maquin, but English name, 'Mister Walker,' very good man;" this was the person he was called after.

These Indians are scrupulous in their observance of the Sabbath, and show great reluctance to having any dealings in the way of trading or pursuing their usual avocations of hunting or fishing on that day.

The young Indians are very expert in the use of a long bow, with wooden arrows, rather heavy and blunt at the end. Maquin said he could shoot ducks and small birds with his arrows; but I should think they were not calculated to reach objects at any great distance, as they appeared very heavy.

'Tis sweet to hear the Indians singing their hymns of a Sunday night; their rich soft voices rising in the still evening air. I have often listened to this little choir praising the Lord's name in the simplicity and fervor of their hearts, and have felt it was a reproach that these poor half-civilized wanderers should alone be found to gather together to give glory to God in the wilderness.

I was much pleased with the simple piety of our friend the hunter Peter's squaw, a stout, swarthy matron, of most amiable expression. We were taking our tea when she softly opened the door, and looked in; an encouraging smile induced her to enter, and, depositing a brown papoose (Indian for baby or little child) on the ground, she gazed round with curiosity and delight in her eyes. We offered her some tea and bread, motioning to her to take a vacant seat beside the table. She seemed pleased by the invitation, and drawing her little one to her knee, poured some tea into the saucer, and gave it to the child to drink. She ate very moderately, and when she had finished, rose, and wrapping her face in the folds of her blanket, bent down her head on her breast in the attitude of prayer. This little act of devotion was performed without the slightest appearance of pharisaical display, but in singleness and simplicity of heart. She then thanked us with a face beaming with smiles and good-humor; and, taking little Rachel by the hands, threw her over her shoulder with a peculiar sleight that I feared would dislocate the tender thing's arms, but the papoose seemed well satisfied with this mode of treatment.

In long journeys the children are placed in upright baskets of a peculiar form, which are fastened round the necks of the mothers by straps of deer-skin; but the young infant is swathed to a sort of flat cradle, secured with flexible hoops, to prevent it from falling out. To these machines they are strapped, so as to be unable to move a limb. Much finery is often displayed in the outer covering and the bandages that confine the papoose.

There is a sling attached to this cradle that passes over the squaw's neck, the

A Papoose.

back of the babe being placed to the back of the mother, and its face outward. The first thing a squaw does on entering a house is to release herself from her burden, and stick it up against the wall, or chair, chest, or any thing that will support it, where the passive prisoner stands, looking not unlike a mummy in its case.

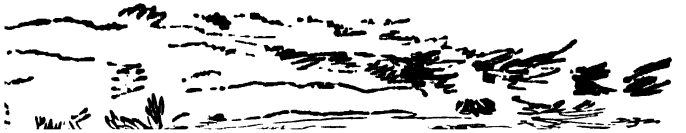
The squaws are most affectionate to their little ones. Gentleness and good-humor appear distinguishing traits in the tempers of the female Indians; whether this be natural to their characters, the savage state, or the softening effects of Christianity, I cannot determine. Certainly in no instance does the Christian religion appear more lovely than when, untainted by the doubts and infidelity of modern skeptics, it is displayed in the conduct of the reclaimed Indian, breaking down the strongholds of idolatry and natural evil, and bringing forth the fruits of holiness and morality. They may be said to receive the truths of the Gospel as little children, with simplicity of heart and unclouded faith.

The squaws are very ingenious in many of their handiworks. We find their birch-bark baskets very convenient for a number of purposes. My bread-basket, knife-tray, sugar-basket, are all of this humble material. When ornamented and wrought in patterns with dyed quills, I can assure you, they are by no means inelegant. They manufacture vessels of birch-bark so well, that they will serve for many useful household purposes, such as holding water, milk, broth, or any other liquid; they are sewn or rather stitched together with the tough roots of the tamarack or larch, or else with strips of cedar-bark. They also weave very useful sorts of baskets from the inner rind of the bass-wood and white-ash. Some of these baskets, of a coarse kind, are made use of for gathering up potatoes, Indian corn, or turnips; the settlers finding them very good substitutes for the osier-baskets used for such purposes in civilized countries.

The Indians are acquainted with a variety of dyes with which they stain the more elegant fancy-baskets and porcupine quills. Our parlor is ornamented

AN INDIAN CHILD'S GRAVE. Fond du Lac.

AN INDIAN CHILD'S GRAVE. Fond du Lac.



ITALIAN MENDICANT.

ITALIAN MENDICANT.

[See page 517.]

PROBABLY no country in the world can present such a perfect system of mendicity, matured in all its parts, as Italy, especially the southern portion in the vicinity of Naples. There the traveller is beset by beggars upon the highroad, in the public streets, and almost within his hotel; and if he drives them off without remunerating them for the trouble of calling upon him, he is like the fox in the fable, a larger swarm returns to harass him. But the fact of beggary would not render the fraternity so odious, did their condition and pursuit arise from the necessities of want. This is not the case in the majority of instances, for the character is assumed as an excuse for idleness.

Travellers state that they have been attacked by one from a crowd of these mendicants, who would be afflicted with the want of an eye, a leg, and often the senses of hearing and speech, until he received his fee, and then, before the benevolent donor was fairly out of sight, the afflicted beneficiary would stand among his companions with as perfect legs, eyes, &c. as the best specimen of humanity. This species of false pretence is said to be very common among the Italian beggars, and their assumed distortions of countenance and multifarious "ills which flesh is heir to" are, nine times out of ten, base forgeries; considered by them, however, as fair business transactions. Happily, in our own country, such a class of mendicants does not exist, and in most cases here, when we are petitioned for alms, the petitioner is really an object of sympathy, unless we can trace in his features the lineaments of intemperance.

THE DRUIDS.

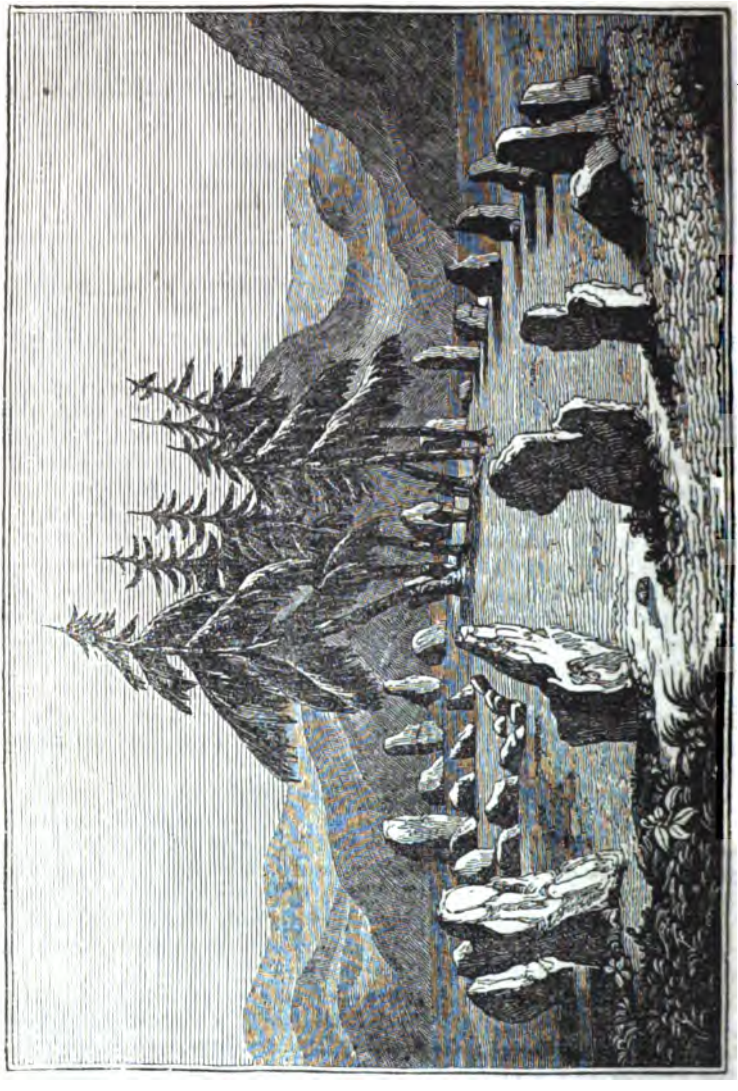
DRUIDICAL TEMPLE NEAR KESWICK, IN CUMBERLAND.

> Time-honor'd pile! by simple builders rear'd,
> Mysterious round, through distant times revered,
> Ordain'd with earth's revolving orb to last,
> Thou bring'st to mind the present and the past.
>
> Dr. Ogilvie's *Fame of the Druids.*

The Druidical Circle, represented in the accompanying plate, is to be found on the summit of a bold and commanding eminence called Castle-Rigg, about a mile and a half on the old road, leading from Keswick, over the hills to Penrith,—a situation so wild, vast, and beautiful, that one cannot, perhaps, find better terms to convey an idea of it than by adopting the language of a celebrated female writer, (Mrs. Radcliffe,) who, travelling over the same ground years ago, thus described the scene: "Whether our judgment," she says, "was influenced by the authority of a Druid's choice, or that the place itself commanded the opinion, we thought this situation the most severely grand of any hitherto passed. There is, perhaps, not a single object in the scene that interrupts the solemn tone of feeling impressed by its general character of profound solitude, greatness, and awful wildness. Castle-Rigg is the centre point of three valleys that dart immediately under it from the eye, and whose mountains form part of an amphitheatre, which is completed by those of Borrowdale on the west, and by the precipices of Skiddaw and Saddleback, close on the north. The hue which pervades all these mountains is that of dark heath or rock; they are thrown into every form and direction that fancy would suggest, and are at that distance which allows all their grandeur to prevail. Such seclusion and sublimity were indeed well suited to the dark and wild mysteries of the Druids."

These temples of the Druids, though all in a circular form, (supposed to have been emblematic of the Deity,) present three varieties, which Dr. Stukeley classed as follows. The round temples, simply, he called temples, and such he considered to be the one at Rollrich, in Oxfordshire, and which also resembles this. Those with the form of a snake annexed, as that of Abury, in Wiltshire, he called serpentine temples, or *Dracontia*, by which they were denominated of old; and those with the form of wings annexed (as he supposed Stone-Henge to have been) he called *Altæ*, or winged temples.

The one here represented is of the first, or simple class, and consists, at present, of about forty stones of different sizes, all, or most of them, of dark granite,—the highest about seven feet, several about four, and others considerably less; the few fir-trees in the centre are, of course, of very modern growth. The form may, with more propriety, be called an oval, being thirty-five yards in one direction, and thirty-three yards in another, in which respect it assimilates exactly to that of Rollrich; but what distinguishes this from all other Druidical remains of a similar nature, is the rectangular enclosure on the eastward side of the circle, including a space of about eight feet by four. The object of this



DRUIDICAL REMAINS, NEAR KESWICK, IN CUMBERLAND.

is a matter of conjecture;—by some it is supposed to have been a sort of Holy of Holies where the Druids met, separated from the vulgar, to perform their rites, their divinations, or sit in council to determine controversies; others consider it to have been for the purposes of burial; probably it might have been intended for both.

That the Druids also performed their worship in the seclusion of groves is a fact generally stated in history. The Isle of Anglesey, formerly covered with wood, was a celebrated sanctuary for them; and it is more than probable that these circular stone temples, in the midst of elevated moors or plains, were places at which the people from the surrounding districts were at stated times assembled, either for the purposes of justice, or for determining upon affairs affecting the welfare of the community, and which meetings were also accompanied with the performance of religious ceremonies.

That the earliest temples and altars were formed of stones, rough and unhewn, is, we believe, admitted by all writers. Numerous passages may be quoted from the Old Testament in allusion to it, but one amongst the rest may be noticed more particularly, viz., Exodus xxiv. 4: "And Moses rose early in the morning, and builded an altar under the hill, and twelve pillars according to the twelve tribes of Israel." It appears also, that in patriarchal times they planted groves as temples for worship, and in hot countries this was done, as well for convenience in the summer season as also for magnificence. Abraham, we read, "dwelt long at Beersheba, where he planted a grove, and called upon the name of the Lord," and in these groves were also erected temples of stone.

The patriarchal mode of worship passed over all the western world, and is supposed to have been introduced into this country by the neighboring Celtæ or Gauls, or by the Phœnicians, who traded hither for tin. However this may be, when the Romans invaded Britain, they found the Druids presiding over and conducting the worship of the country; acting also as judges and arbiters in all differences and disputes, both public and private. It is from Cæsar, and other Roman writers, that most of the information we have respecting them is derived, for they had no written rules or regulations either as to their religion, their science, or their laws. The accounts therefore furnished by these historians of the religion and customs of the Druids, written principally from mere report, and under a hostile impression towards them, are not altogether to be relied upon; indeed, the barbarities ascribed to them, in the ceremonial of their religion, are so much at variance with their high and acknowledged character in learning and general science, that one cannot but imagine them to be highly exaggerated, if not altogether fabulous.

The best authorities on the subject of the Druids seem to agree in the following description of them. They were the first and most distinguished order amongst both the Gauls and Britons; they were chosen from the best families, and the honors of their birth, joined with those of their function, procured them the highest veneration amongst the people. They were versed in astrology, geometry, natural philosophy, politics, and geography; they were the interpreters of religion, and the judges of all affairs indifferently; they were the instructers of the youth, and taught by memory, as they never allowed their instructions to be written.

Their garments were remarkably long, and when employed in religious ceremonies they always wore a white surplice. They generally carried a wand in their hand, and wore a kind of ornament enchased in gold about their necks, called the Druid's egg; they are also represented with a hatchet in their girdle, used for the cutting of the mistletoe.

They believed in the immortality of the soul, and worshipped one Supreme

GIGANTIC DRUIDICAL IDOL.

Being. They attached a degree of sanctity to the oak, and wore chaplets of it in their religious ceremonies. They were deeply versed in astronomy, and computed their time by nights and not by days; and all their great solemnities, both sacred and civil, were regulated by the age and aspect of the Moon. Their most august ceremony of cutting the mistletoe from the oak was always performed on the sixth day of the Moon. In medicine also they were great proficients, and possessed, in fact, great store of knowledge in all sciences; so much so, that Pliny speaks of them as practising magic, and being so great proficients therein as to equal the Persian and Chaldæan Magi, so that one would even think, he says, that the Druids had taught it them.

The number three was said to be a favorite number with them, and part of their religious worship consisted in a solemn adoration, or three silent bowings.

The Romans on their invasion endeavored to exterminate the Druids, but it does not appear that they induced the natives to adopt their own system of polytheism. The seeds of their ancient religion still continued implanted in their minds, and opened a ready access to the doctrines of Christianity, which are said to have made more progress in Britain and Gaul (from the time of the first preaching of the Gospel) than in any other country.

Of this old patriarchal religion, the only remains, in substance, to be found at present, are the stone temples, of which few, if any, are in so perfect a state as the one here represented. The groves have long since fallen beneath the axe, and most of the stone temples have been spoiled for the value of the materials in making fences or roads, or mending habitations; the mallet of the geologist now comes in to aid the destruction, so that in a few years more this temple, like the rest, may disappear.

Of the form and ceremonies of the religion no traces are to be found, except in the representation of scenes of magic, in which we invariably see the magic circle,—the witch in a robe, with a wand in her hand, and various other allusions to Druidical ceremonies. Who can think of the subject without calling to mind the scene in *Macbeth*, where Hecate, by way of preparation for the incantation, says to the Witches—

> "I'm for the air . . . .
> Upon the *corner* of the *moon*
> There hangs a vaporous drop profound,
> I'll catch it, ere it come to ground;
> And that, distill'd by magic slights,
> Shall raise such artificial sprights,
> As, by the strength of their illusion,
> Shall draw him on to his confusion."

Part of the ingredients of the caldron were

> . . . . . "Slips of yew
> Slivered in the *moon's* eclipse:"

and there are other passages alluding to their ceremonials.

"Time rolls his ceaseless course," bearing on his wings the lessons of Divine Truth to the different regions of the earth. How many forms of religion have already been cast into the shade by them! And the period will doubtless arrive when the Temple of Jagganatha, now an object of veneration to millions, will, with his ceremonies, become the subject of some legendary tale, or, like the Druids' temple, a mere theme for the antiquary.

STONEHENGE.

[See page 525.]

THIS mysterious monument of antiquity, or, as it has been called, the "Glory of Wiltshire," and the "Wonder of the West," is situated on Salisbury Plain, about two miles directly west of Amesbury, and seven north of Salisbury.

It is the general opinion of historians, that it was an ancient temple of the Druids, the pagan priests of Britain, or at any rate, that it was employed by them for the celebration of some of their mysteries.

Sir Richard Colt Hoare, who holds this opinion, in describing it, says, "This temple consists of two circles and two ovals: the two latter constituting the cell or sanctum. The outward circle, about 300 feet in circumference, is composed of huge upright stones, bearing others over them, which form a kind of architrave. Though they evidently show the mark of tools, they are still irregular in their forms and sizes. The height of the stones on each side of the entrance is a little more than 13 feet, and the breadth of one 7 feet, and of the other 6 feet 4 inches; the impost over them is about 2 feet 8 inches deep. The space between the stones in this outer circle varies; that between the entrance-stones is 5 feet, and rather wider than in the rest: this circle consisted originally of thirty stones, of which seventeen still remain standing. At the distance of 8 feet 3 inches from the inside of this outer circle, we find another composed of smaller stones, rude and irregular in their shapes.

"We come now to the grandest part of our temple, the cell or sanctum: in forming which, the general plan has been varied; for this inner temple represents two-thirds of a large oval, within which is the same portion of a smaller oval. The large oval is formed by five pairs of trilithons, or two large upright stones, with a third laid over them as an impost. The placing of the imposts is also varied, for they are not continued all round, as in the outward circle, but are divided into pairs, thereby giving a greater lightness to the work, and breaking its uniformity; neither are they, like those of the outer circle, parallel at top: but they rise gradually in height from east to west."

On examining the stones that have fallen down, we perceive in those that formed the imposts, or cross-pieces, deep cavities, or mortises; and on the top of the upright blocks are corresponding projections, acting as tenons, and giving great solidity to the work. The largest stones in the outer oval measure 22 feet in length.

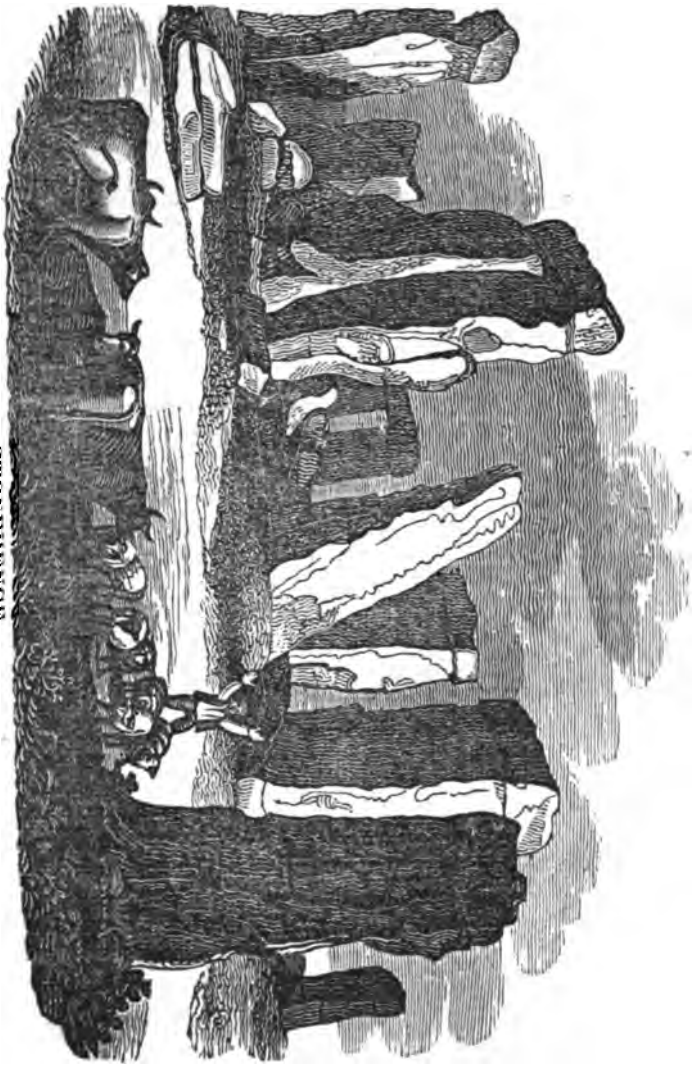
The whole mass of stone-work was surrounded by a deep ditch, on the outside of which was an embankment. From that part of the ruins where it is supposed the entrance was originally placed, a raised pathway is still to be seen, which, after running towards the north-east the distance of 594 yards, branches off to the south and north.

The plain in the neighborhood of these ruins possesses a very singular character, being covered with numerous barrows, that is, mounds of earth, which, on being opened, appear to have been places of burial, from their containing bones of human beings, and such relicts as were usually buried in old times with the deceased.

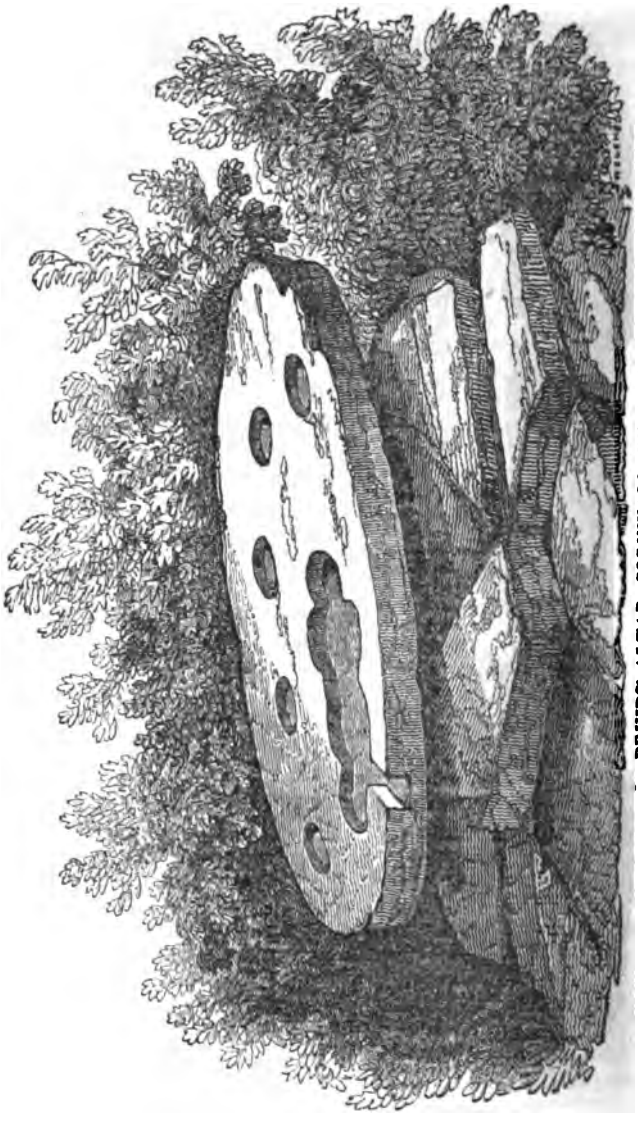
Within a short distance, also, are two long level pieces of ground, surrounded by a ditch and a bank, with a long mound of earth crossing one end, bearing a great resemblance to the ancient Roman courses for horse racing.

In the year 1797, three of the stones which formed part of the oval in the centre, fell to the earth; and this appears to have been the only instance on record of any alteration having taken place in these remains of antiquity.

For whatever purpose it was erected, or whoever may have been the archi-

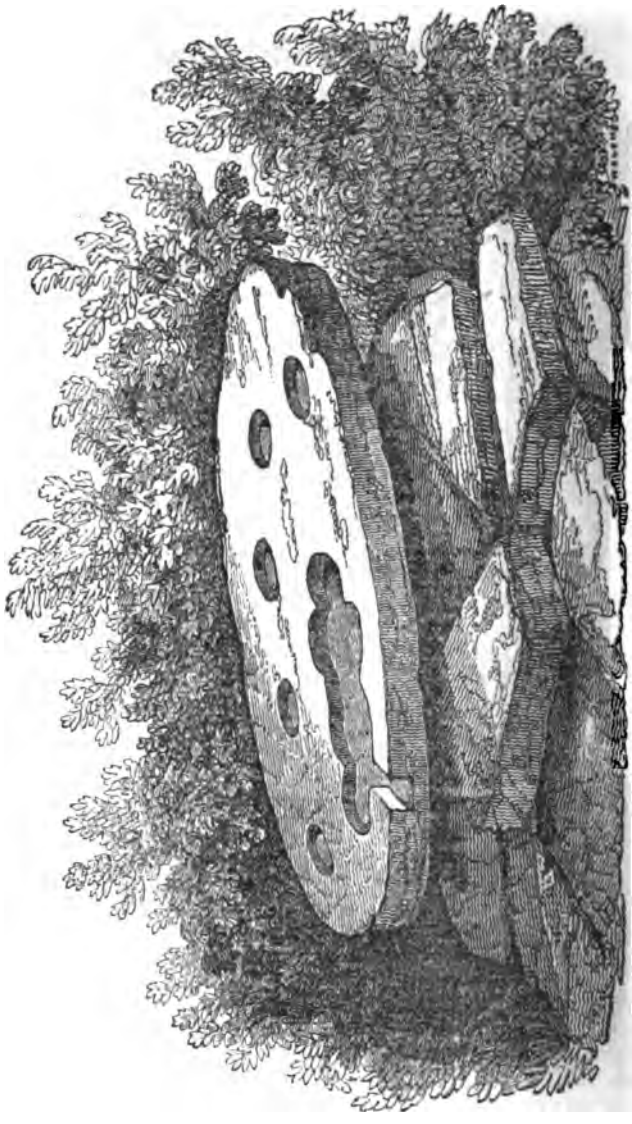


STONEHENGE.



DRUIDS' ALTAR, CORNWALL, ENGLAND.

DRUID'S ALTAR, ISLAND MAGEE.



DRUIDS' ALTAR, CORNWALL, ENGLAND.

DRUID'S ALTAR, ISLAND MAGEE.

tects, the immense labor necessarily employed in bringing together the materials, and the amazing mechanical power that must have been used to raise the stones, some of which weigh upwards of 70 tons, to their proper situations, show, that it could have only been constructed for some great national purpose, connected either with religion or the government of the state.

DRUIDS' ALTAR, ISLAND MAGEE.

[See page 527.]

On an eminence near the north-east extremity of Island Magee, County of Antrim, there still remains one of those monuments of the olden time, which antiquaries have distinguished by the name of Druids' altars. According to some authors, the religious rites of our Pagan ancestors were performed on hills or mountains, while others assert they worshipped only in woods or groves on the plains. In illustration of those assertions, we can assure the reader that we have seen those objects in all those situations—on the mountain and in the dale, on the hill and in the wood, on the rock and in the plain. There are other antiquarians, however, who deny that those extraordinary remains were altars, and consider them rather as ancient tombs; and perhaps they were intended for both purposes, for among many ancient nations, their earliest altars were the monuments of the dead.

The altar now under consideration consists of six large stones, standing upright, and forming two rows, about two feet asunder, and extending east and west. Four of the stones are on the north side, and two on the south, each stone being fully three feet above ground. On these rests a large flat slab, upwards of six feet in length, pretty smooth on both sides, and nearly two feet thick. The breadth is unequal, its west end being near six feet, but sloping to the east to about half that breadth. At present, this slab rests only on two stones on the north side, and one on the south; the others seem as if they had crept into the earth, to avoid bearing up this enormous load. From several large stones lying about, and seen in the adjoining fences, it is alleged that this altar was formerly encompassed by a circle of stones.

In ploughing in the field in which this altar stands, in 1817, a spiral instrument of pure gold, 11 inches in length, was discovered; and a few years after,

several detached parts of a gold collar, or *Torquois*, were dug up near the altar. In March, 1824, several spiral golden ornaments of the above form, supposed to be armlets, or bracelets for the arms, were found in a rich soil or mould; the largest weighed 526 grains, a lesser one 188 grains. They were turned up by the plough, about three or four feet from the altar—one of them was of a different structure from the other, and appeared as if two plates were applied to each other.

In the back ground of this view is seen the peninsula of Curran, near the extremity of which stand some ruins of the ancient Castle of Olderfleet, about one mile from the town of Larne. It was on this peninsula that Lord Edward Bruce landed with 6,000 men, on the 25th May, 1315, being invited over by *O'Neil*, and other Irish chieftains, to become king of Ireland.

THE END.

NOTICES AND RECOMMENDATIONS

OF

SEARS' BIBLE BIOGRAPHY.

THE PUBLISHER of "BIBLE BIOGRAPHY" respectfully requests of the Christian Public a careful perusal of the following recommendations. In preparing the present volume, he has sought to make a book the very best and most useful one published in modern times—worthy of universal circulation, that it might justly be entitled to universal patronage and support. Its examination, it will be found, useful, and eminently adapted to interest, instruct, and improve. It is adapted to persons of all ages and of every rank, and is equally worthy of a place in the parlor as in the kitchen, among the limited collection of the young, as well as the various and more extended library of the man of reading. We think it would be difficult to select a more appropriate GIFT at the approaching holidays. The sufferings of the most eminent Christians that have ever lived are laid under contribution, and passages of eminent beauty are taken from them. If, therefore, variety has charms, or religion a lovely, or eloquence is admired, this work will be read with delight. It fears be variety without lewdness, religion without fanaticism, and eloquence pleading the cause of God with man. A few only out of the numerous recommendations the work has already received, will be inserted here:—

From the Rev. Charles G. Sommers, A. M., Corresponding Secretary of the American and Foreign Bible Society.

MR. ROBERT SEARS—Dear Sir: Your new and beautiful work on the BIOGRAPHY OF THE BIBLE appears to attract the attention of all classes, and is unanimously deemed to possess, if it be not already, one of the most popular works ever issued in this country. The HOLY SCRIPTURES, on account of their antiquity, dignity, and many excellences, far exceed all the writings of the moralists. Indeed, if we consider how many centuries have passed away since they were published, and how miraculously they have been preserved to the present time, they almost appear to have been the peculiar care of GOD himself. We ought also to prize the SCRIPTURES, as containing every system of PHILOSOPHY that is useful and admirable. Where we know whence natural philosophy, with astronomy, and other speculations on it, derive their origin? Because the books of Genesis, Job, and Ecclesiastes. What writings abound more in ethics or moral precepts than the sacred and admirable Proverbs? What more curious, regular, or pleasing history can we find, than in Genesis, Exodus, Joshua, and Judges? How free from sophistry are the HOLY SCRIPTURES, and how solid are all the arguments used in them? Geometry is displayed in the building of the Tabernacle, and the working in metals and wood was known long before the building of Solomon's Temple; in short, all matters of learning, arts, and sciences, is comprehended within those sacred pages. They are so exactly disposed, that they are a magazine accommodated to all places, times, and persons; so that St. Basil justly calls them a Pharmacopœia, furnished with medicines for all sores and sensations. From fears, in times of peace and religion, the inspired writers and disciples; in times of heresy, they furnished the orthodox with stability in the faith, and assisted them in the conversion of error. From boasts, in prosperity, we learn humility and modesty; in adversity, magnanimity and patience. In danger, it gives us wisdom and; and finally, it shows unto ourselves our philosophy, and exercises our morals, nothing but the rule of God's word can restore religion to its primitive state and dignity; for that alone should be the standard of our thoughts, and guide of our actions.

These reflections have arisen in my mind after a careful and serious perusal of your new and elegant work on SACRED BIOGRAPHY. It leads the mind of the reader, whether he be given or not, directly to the SCRIPTURES. All helps to arrive at their true meaning ought to be valued and encouraged. But the humble follower of the SAVIOUR will need no other recommendation to the diligent performance of this duty than that recommended by CHRIST himself—"Search the Scriptures." And in obedience to the precept, the apostles and fathers of the Christian Church made it their great concern to exhort all men to the study of them. The Old Testament is indeed a system of every kind of knowledge useful for the conduct of human life; and from which the philosophers and legislators of all ages drew the best of their observations, and the authors of both sacred and civil laws have from thence derived their most useful institutions.

But the excellency of SACRED HISTORY will more evidently appear if we compare it with the accounts of the most and most ancient heathen writers. How obscure and trifling are their stories of Deucalion's flood, of Prometheus, and Hercules, and their general notions of the existence of the world from eternity! In short, all profane history is filled with obscurity and fables, before the Olympiads, which were then first certain era, and which did not commence till many centuries after the time of Moses. And, indeed, if we pay no reference to it, we shall find at the best parts in the common daily transactions of life. There only we have the true account of the rise and fall of the most early kingdoms of the world; and by their example, either to prosperity or adversity, learn to be wise and happy. If we compare the Greek and Roman histories with the *Sacred History*, we shall find the latter to abound with the more illustrious examples of human virtue. Rome can boast of Act Tarquinius and Scævola; also, in a more humane than sanguine history, mention then sent to the public good, but who would not rather admire the obedience of Isaac ABRAHAM, who had received his natural heir a victim to the will of God? Historians and poets may explain the courage of the Roman age where, sign, in defiance of their country, slew their enemies in single combat; but how much do they come of the sacred David, who, though but a stripling, unassisted and slew the gigantic Goliath, and by his mere persuasion on very victory over the Philistines? Alexander's action in modes of praise, who, when he had conquered Darius, would not allow himself the pleasure of enjoying his beautiful captives, but he should be tempted to Darius; but what is this to the conference of Joseph, who fled from the actual solicitations of his beautiful mistress into a dungeon? They may talk of the fortitude and firmness of their warlike heroes—Dion Cocceius, Pompey, Hannibal, Scipio, and Alexander; but how much more illustrious the examples of Moses, Joshua, Samson, Gideon, Barak, and Saul, who, inspired with more than human courage, with a handful of men, triumphed on their numerous enemies,—and to humiliate whose conquests, the very elements conspired, and fought on their side!

The time would fail me to go more fully into this subject. In the work before me I find a particular delineation of all the principal passages recorded in the Sacred Records. Who will not delight to read the stories of Moses, Samson, Ruth, Jonathan, and, above all, the life, death, and sufferings of the REDEEMER himself! The serious mind, from its intrinsic excellence—independent of its pictorial embellishments—proves a rich treat to all lovers of Bible History; and will be eminently useful in creating and cherishing a taste for the study of the SACRED ORACLES.

Yours, truly,

CHARLES G. SOMMERS.

From the Editors of the New York Observer, July 30, 1842.

THE following editorial notice of Mr. Sears' new and elegant work on the Bible, is from the New York Observer, one of the oldest, most respectable, and best conducted religious newspapers published in the United States. An opinion coming from this high quarter is worth a thousand of the ephemeral puffs that are published in the papers of the day :—

"We have just received this work, published under the editorial auspices of Mr. Sears, the publisher of the 'Pictorial Illustrations.' It is brought out with great neatness, the paper and typography of the first quality, and the engravings, many of them, for wood-cuts, are very fine. The frontispiece, by Lossing, is particularly worthy of commendation, being one of the finest specimens of wood-engraving which we have lately seen.

"The reading matter consists of well-drawn biographies of distinguished Scripture personages, and written for the special instruction of the young, who will be pleased with the general appearance of the book. The Appendix contains a series of selected Biblical articles, carefully condensed and compiled from the most distinguished writers, constituting altogether the most valuable part of the work.—Published and for sale at 122 Nassau st."

From the Rev. Spencer H. Cone, President of the American and Foreign Bible Society.

MR. ROBERT SEARS—*Dear Sir:* I am pleased with your new and elegant volume of 'Bible Biography;' and, judging from those portions which I have selected for examination, I have great pleasure in stating that I consider it to be a very valuable addition to existing works of a similar description. It contains a vast mass of the results of Biblical criticism, selected with judgment from multifarious sources, most of which are altogether inaccessible to general readers, and many of them even to such as make the Scriptures the subject of professional study. The several hundred engravings are well executed; and the entire getting up of the work reflects much credit on its editor and publisher. Yours, &c.

SPENCER H. CONE.

From Charles Van Wyck, Esq., Publisher and Proprietor of the New York Christian Intelligencer.

MR. ROBERT SEARS—*Dear Sir:* From the specimens of the work which you submitted to my examination, while preparing it for the press, I felt fully assured that it would answer well to its title, and meet with general approbation. Since its publication, I am more convinced of its intrinsic beauty and excellency; and it would answer well to the title of a "Condensed Commentary of the Scriptures." Your new and elegant octavo volume of 500 pages, with its numerous embellishments, does indeed contain a large amount and variety of matter within very narrow bounds; matter collected from I know not how many of the most esteemed commentators, ancient and modern, interspersed with a due proportion of what is original. But *condensation* is far from being its only merit. There is not only *multum in parvo*, but the *selection* is judicious. There is little that is superfluous. On passages of any difficulty the views of different critics and commentators are given. On the whole, the "Bible Biography" appears to do great credit both to the industry and the judgment of the editor; and to such students and preachers as may not have access to many books, and to ordinary Christians in the same predicament, to supply an important *desideratum*. It will prove also very useful for reading in the family. Yours, &c.,

CHARLES VAN WYCK.

From the Rev. Duncan Dunbar, Pastor of the MacDougal Street Church, New York.

MR. ROBERT SEARS—*Dear Sir:* I take great pleasure in recommending your elegant volume on "Scripture Biography" to the members of my church and congregation; and more especially to the YOUNG PEOPLE of my charge. The character and popularity of your previous works are, I presume, known to ALL. I regard the present volume as worthy of the highest commendation. I shall only say, for soundness of doctrine, clear and forcible expression, sterling masculine sense, as well as faithful exhibition of what I believe to be the meaning of the inspired text, your "Bible Biography" cannot be too highly commended. As a whole, it is a work which is eminently calculated to promote correct and Scriptural views of the Word of God. And I should be glad to see it in the libraries not only of our students and ministers, but also of more general readers. Though fitted to be of great service to those who are called to expound the Word of God to others, it is written in a style which any person of intelligence and moderate learning may easily understand and appreciate; and handling, as it does, *all the leading topics, both in faith and practice*, connected with the Gospel, it is well calculated to correct the loose views which are too often entertained concerning these, and to diffuse a knowledge of the principles which ought to be followed in interpreting the Word of God. The Dissertations in the last part of the work are on topics of great moment in themselves, and peculiarly important to be correctly understood in the present times. The arguments in these dissertations are conducted with the characteristic force and skill of the author. In short, it is a work of superlative merit, and a "Book of Gems." It presents the evidences of Divine Revelation in a very full, varied, and interesting form. The Christian who carefully reads it, will rise from the perusal, not only more deeply convinced of the truth of Christianity, but more fully acquainted with its important truths. The "Life of Christ" is peculiarly interesting. Persons who have dear relatives to whom they wish to recommend the Gospel, will find Mr. Sears' "Bible Biography" a volume peculiarly suitable to them. Yours, &c.

DUNCAN DUNBAR.

From the Rev. John Dowling, A. M., Pastor of the Pine Street Church, Providence, Rhode Island.

MR. ROBERT SEARS—*Dear Sir:* I am happy to express the conviction that your "Bible Biography" is a valuable accession to the happily abundant and multiplying means of promoting the intelligent study of the divine oracles, while the higher object of practical religion and godly edifying is constantly kept in view, and is well sustained by the reflections at the end of each biography. The explanatory notes of the appendix comprehend a vast amount of historical, antiquarian, and critical illustrations, which are not to be found in many excellent expositions, though far more voluminous. The learned editor has taken a large scope in collecting those illustrations from authors, ancient and modern, heathen, Jewish, and Christian, common and sacred, travellers, naturalists, historians, poets, antiquaries, critics, and divines. By these laborious compilations a welcome light is cast upon obscure passages; many and serious difficulties are obviated; facts and minute circumstances which are faintly alluded to, or tacitly implied, in the Scripture text, are brought forward to advantageous application; the connexion of history, both sacred and profane, and the fulfilment of prophecy, are presented, to the increase of our knowledge and the confirmation of our faith; and I cannot doubt but that by the use of this work the reading of the word of God will be rendered much more beneficial to all classes, in the present active and inquiring age. Yours, &c.,

JOHN DOWLING.

From the Rev. James L. Hodge, Pastor of the Baptist Church, Brooklyn, Long Island.

MR. ROBERT SEARS—*Dear Sir:* If my recommendation of your new and elegant volume on "Sacred Biography" can be of any service, I can give it conscientiously and cheerfully. It need not, however, be puffed off; it is sure to obtain a large sale from the highly respectable names and recommendations by which it is already sanctioned.

and wherever it goes it will not fail to commend itself, and to extend continually the circle of its possessors. To me as a minister it has already been of great use, by having on a vast deal of topics to interest and the different sections of critics and commentators; and of what value such it is to those who have none of these within their reach. You have bestowed a wonderful and rare in your collection of materials as well as extreme a judgment and accuracy in the disposal of them, which stands you in good place; and it will not be the least of your rewards, that many an humble labourer in the field of Scriptural knowledge, will often, in secret, send an aspiration of gratitude to God for the assistance you have afforded him. I commend all my people to procure and read this invaluable work.

Yours, &c.

JAMES L. HODGE.

The following recommendatory notice of the work has been freely furnished by the Rev. B. T. Welch, D. D., *of Albany, N. Y., one of our most distinguished divines and scholars:—*

ALBANY, N. Y., AUGUST 4, 1862.

Mr. Robert Sears—*Dear Sir:* I thank you for your beautiful and charming volume of "Bible Biography." It has indeed in me raised a feeling of gratitude for your continued labours in the cause of God's Holy Oracles, in which I am persuaded the entire taste and intelligence of all evangelical denominations must participate. The conception of the work has affected me with gratification; and the more as from the conviction that whatever tends to render the study of the Scriptures interesting to the young mind must necessarily be useful, and, by the blessing of God, may become saving. I am persuaded, however, that its best recommendation is its own attractive appearance and exhibiting critical excellence. I have rarely, if ever, seen a volume combining so much of important information in a form so attractive. It will be an invaluable aid to the leader of the Bible Class, the Sabbath School teacher, and not less so to the Christian Parent, and will also, be regarded by them as indispensable.

The execution of the work, its typographical neatness, and especially the numerous and beautiful engravings that adorn its pages, are equally honorable to the talent of the artists, and the liberality of the publishers and editor. Should the patronage of the Christian Public be at all commensurate with the merits of the work, your labors will be amply rewarded.

Yours, &c.

B. T. WELCH.

From James A. Sparks, Esq., Publisher of the New York Churchman.

Mr. Robert Sears—*Dear Sir:* The design of your work is good; and if the work is generally executed as well as I have found it to be in those places which I have had occasion to examine, it will be of great service to those students who could neither afford to purchase voluminous works of elaborate criticism, nor find time to read them.

Yours, &c.

JAMES A. SPARKS.

From the Rev. Samuel H. Meeker, Pastor of the Reformed Dutch Church, Bushwick, Long Island.

Mr. Robert Sears—*Dear Sir:* I have read with great pleasure a considerable part of the "Bible Biography." The work is indeed unique in parts; and is all that it professes to be in its excellent and significant title. In your selection of the materials you have evinced laborious industry, and a profound and accurate judgment. The collections at the end of the chapters are short, devotional, and suitable for reading either in the family or in the school. The serious and intelligent Christian will find here very much to gratify and enlighten his mind; whilst to the minister who has not access to a large biblical library, there is presented, within the shortest possible compass, the result of the labors of the most eminent interpreters of the word of God. It may safely be asserted that the "Bible Biography" is the cheapest and handsomest work that has ever yet been published. Yours, &c.,

SAMUEL H. MEEKER.

From the Rev. Elisha Tucker, (formerly of Rochester, N. Y.,) Pastor of the Olivet Street Church, New York.

Mr. Robert Sears—*Dear Sir:* Accept of my thanks for the copy of "Bible Biography," which you sent me. I cheerfully give my opinion in favor of this excellent and important work. It could have cost my esteemed friend, the author, amounts of no ordinary character; and cannot fail to be appreciated by all who love the Holy Scriptures. I cannot help expressing particularly to the considerable number enclosed in the last hundred pages of the "Biography." This portion of our most valuable English and American critics must be a great convenience to such ministers, students, and private Christians, who cannot afford to purchase every commentator; for here are the opinions of many valuable authors condensed in a small space. For those who can purchase but one book, I regard it the Bible, certainly as one too much is.

In short, I consider this volume a valuable addition to our biblical literature—valuable to the student for its critical selections and references—to the private Christian and the family man for its brief, well-chosen, and pious reflections—to all readers of the Sacred Scriptures, for the quantity of important matter which is compressed in very concise limits. I trust it will obtain the extensive circulation which it unquestionably deserves.

Yours, truly,

ELISHA TUCKER.

From the Rev. Sidney A. Corey, Pastor of the Ship Ring Church, N. Y.

Mr. Robert Sears—*Dear Sir:* I hesitated to recommend your new and splendid work on Scripture Biography, until I had carefully perused every page. I now feel free to say, that I find it filled with the most valuable information in the cases embraced here. The practical reflections at the close of each chapter are pertinent and evangelical. It is to my mind recommendatory to your volume, that while its sentiments are orthodox, and its tone evangelical and candid, an immense mass of matter is committed to paper and type so good, that the new Bible Dictionary, or the manual. Upon the whole, it must be commended as a valuable addition to the means which the new affords to the church for obeying the high command so emphatic for all religious prosperity, "Let the word of Christ dwell in you richly in all wisdom."

Yours, &c.,

SIDNEY A. COREY.

From the Rev. Morgan J. Rhees, Corresponding Secretary of the American Publication Society, and Sunday School Union, Assd.

PHILADELPHIA, JUNE, 1862.

Mr. Robert Sears—*Dear Sir:* I feel much obliged to you for a copy of your beautiful and interesting work, entitled the Lives and Characters of all the prominent persons whose history is detailed in the Sacred Writings. These sketches, or each of them as I have had time to look at, appear to be well drawn, and calculated to produce a good impression on the mind. The embellishments are about five hundred, and they are elegant in the best

style of wood engraving. They not only ornament but illustrate the book, and make it much more valuable than it would be without them. The title you have selected is beautiful and appropriate—"A Christian Father's Present to his Family," for it is well adapted for this purpose. Yours, truly,

M. J. RHEES.

☞ The following notice of "Bible Biography" was written by the REV. W. C. BROWNLEE, D. D., after a careful examination of the volume. Dr. B has been long known throughout the United States, as one of our most useful, learned, and eloquent divines. This candid and impartial review cannot fail, therefore, to have great weight with all who are anxious to know the real merits of the work.

New York, Aug. 6, 1842.

This is, beyond question, one of the most elegant books ever presented to our fellow-citizens, in this Republic. It is a volume of 500 pages, containing about 500 engravings of a most interesting character. The paper, the type, the engravings, are all of them such as might enter into a successful competition with any of the finest London publications. It is a superior specimen of domestic fabrication, both external and internal; and it ought, in this respect, to be patronised by every patriotic citizen. But this is the least valuable thing about it. The volume gives us accurate views of Eastern customs, habits, manners, animals, scenery; and, in addition to statements given in brief, accurate, and elegant details, we have every variety of pictorial exhibitions, which at once amuse, interest, delight, and fascinate. In this volume we have, moreover, admirably well written Biographies of all the principal characters mentioned in the HOLY BIBLE. These are selected with taste and singular discrimination, from the best authors extant on the subject. And there is a crowning excellence in the last hundred pages, where we possess a rich treasury of Useful and Religious knowledge, carefully condensed and compiled from "Timpson's Key to the HOLY BIBLE," a work accessible to very few.

Mr. SEARS' object in presenting this admirable and beautiful volume, ought to be duly appreciated by every Minister, Parent, and Sabbath School Teacher. His aim is to extend the interest of the HOLY BIBLE—to place in the most attractive light, its divine truths and holy precepts, by instruction, and by captivating examples. It is, in fact, to make it paramount, in our youths' estimation, to all other books, and all other things:—and most captivating in the eyes of the youthful and aged, the beautiful, the gay, the sober, the thoughtless and reflecting. It is designed to set aside as comparatively insignificant, the numerous volumes of light reading, and utter vanity, and to displace them, with all their fascinating and tawdry ornaments of types, and plates, and wit, by what is more beautiful in art, and more valuable in truth, and more fascinating in biography and anecdote.

Hence, Mr. SEARS has an honest and imperative moral claim for patronage and support, on every Minister and every Parent, and every Sabbath School Teacher, and on every Patriot actuated by Christian principles. I have only to add, to all my friends, and to the people of my numerous charge, that there is, perhaps, no other book, recently from the press, which I would, in preference to this beautiful and judicious volume, put into the hands of my children, to captivate their minds, and woo them over to the study of the antiquities, scenery, biography, and divine truths of the HOLY BIBLE. It ought to be in every Christian Family for its innate value; and in every patriotic family as a splendid specimen of our progress in domestic manufacture, and the advancement of our artists and manufacturers in their rivalship with those of Europe.

W. C. BROWNLEE.

From the Daily Journal.

The "BIBLE BIOGRAPHY," by Mr. Sears, is, in our estimation, the most valuable work of the kind that has ever yet appeared in this country, and so seasonable, that it comes as a desideratum to relieve Christian families from the expense of purchasing a large commentary, which, without being too long, should be sufficiently copious, and without being too critical, should be sufficiently explanatory and practical. A most cordial welcome, therefore, is due to this performance. It must and will receive the entire and hearty commendation of all the friends of religious literature, and the *practical suffrages of many thousands of purchasers!* Few ministers can afford to obtain all those commentaries, the concentrated essence of which is here presented to attention; and to one who possessed the whole of them, this book would be of great utility, as an index. It must have been a work of immense labor and cost to the editor, and it is a matter of congratulation that so much enterprise, judgment, and industry, should have met together, and combined to produce a work which every diligent student of the inspired writings will prize. The paper, typography, and embellishments reflect great credit on all who have been concerned in the production of this Sacred Gem in modern literature.

From the Morning Herald.

This is one of the most beautiful and judicious volumes on the Scriptures we have ever met with. It is impossible for any one to examine this pictorial volume, without wishing to possess a copy for perusal. The work deserves great commendation for the spirit of liberality in which it has been prepared; critics of every creed have been consulted, and the most scrupulous care has been taken to remove every thing sectarian from a volume designed for all denominations of Christians. We are confident every family will purchase the work, after an examination of its merits.

From the Editor of the Protestant Methodist.

It seems, from what we have seen of this beautiful pictorial volume, well to deserve the title, and the strong recommendations it has already received from almost every paper, of all denominations, both political and religious. We trust it may help many to a more diligent and intelligent search of that unfathomable mine of riches—the precious word of the living God.

From the New York Evangelist.

This is a work possessing many novel and uncommonly attractive features. Its appearance is beautiful. Its biographical sketches embrace the most interesting incidents and events in the lives of the principal personages of the Scripture History, woven together in a pleasing and sprightly narrative, and faithfully accompanied with excellent practical lessons. Its chief claim, however, to popularity, consists in its multitudinous pictorial embellishments. Something like five hundred engravings on wood are contained in the volume, many of which are costly and elegant, and in a high style of art, and none discreditable to the theme or the work. These relate to numerous ancient and oriental customs, scenes, manners, history, &c.; and, while they add great spirit and interest to the objects which they illustrate, form of themselves a pleasing and profitable study. The work is a rare combination of the useful and attractive—adapted at once to engage the attention and affect the heart. We should regard its possession by families whose children may obtain from it striking representations of Scriptural truths and events, lasting impressions of their reality, as highly desirable. The Appendix contains thirty brief, but comprehensive and excellent, essays upon the evidences and archæology of the Scriptures, which add greatly to the value of the work as designed for the instruction of youth and families.

From the New York Christian Intelligencer.

This work is an attractive one, not only from the very numerous embellishments which provide it, but from the interesting matter which it contains. It furnishes lives of the principal characters of the Old Testament, with accounts of the Creation, Deluge, Dispersion of Mankind, &c., and an extended life of the Saviour, comprising portraits of the Gospel history. The whole is in a spirited form well adapted for practical usefulness and spiritual outlines of the Gospel history. The work is in a spirit and form well adapted for practical usefulness and spiritual outlines of the Gospel history. The whole is in a spirit and form well adapted for practical usefulness and spiritual improvement. The numerous historical and biographical illustrations of the Sacred Volume introduced into the work, will prove both amusing and instructive to the young especially, and it will be an entertaining and useful work, well worthy

From the New York Churchman, August 6.

From a cursory examination of this work, we feel free to commend it to the favorable notice of all our readers. The matter is compiled, generally, from approved authors, is written in an agreeable style, and cannot fail to interest the young, as well as the general reader. The engravings are neatly executed—especially the frontis piece; and the whole mechanical execution does great credit to its publisher and editor.

From the New York Washingtonian.

It has been beautifully and truly remarked, that of all studies, the study of the Bible tends most to the purity of the heart and the strength and expansion of the intellect. Were we the veriest skeptic that ever mocked the majesty of God, or set at defiance his commands, we would still scatter abroad His holy word, and commend it to those within our influence. Believing, as we do, in its sacred, its elevated character, we cannot but rejoice that means are taking to direct to the Bible the careful and devout attention of all. Whatever is calculated to excite an interest in this volume, or enlighten the understanding in its perusal, we would gladly see encouraged and sustained. The Bible Biography is of this character It records, as its title indicates, the lives and characters of the persons mentioned in the sacred pages, with a simplicity and fidelity, that cannot fail of enlisting the sympathies of the reader, and urging to further and more elaborate inquiry. To the young the work is invaluable; and to them we especially commend it.

From the Cleveland (O.) Herald.

This beautiful work contains about five hundred pictures and we believe it is destined to become one of the most popular and permanent ever issued from the American press. We would respectfully call the attention of all our readers to this invaluable book. It has received the unqualified recommendation of all who have examined it; and is believed to be admirably adapted to exert a wholesome influence on the minds of the young especially, and lead to the formation of correct moral principles.

From the St. John (N. B.) Courier.

Among the literary pursuits which engage the attention of mankind, there is scarcely any species more instructive than that which traces the march of intellectual energy from obscurity to eminence. It records the progress of perseverance in surmounting difficulties; embodies the virtues by which individuals have been distinguished; and holds out both invitation and encouragement to those who are climbing the steep ascent to imperishable honors. The statesman, the warrior, and the man of science, claim from their fellow mortals the meed of praise; and the pen of the biographer is rarely backward to transmit their names and actions to posterity. But while these, and such characters as these, arrest our attention, and command our esteem, we must not forget, that the man who devotes his time to the cultivation of literature, mounts into a still higher region, and expatiates at large in the vast empire of the intellectual world. He traces the operations of the mind through the diversified labyrinths of its excursions, connects abstraction with fact, and combines, in new associations, the harmonious agreement of ideas.

We have been irresistibly led into these reflections by a careful perusal of Mr. SEARS' new and beautiful work on the Bible. Of the importance of the above truths, our pious and intelligent author seems to be fully aware. He here brings the results of his speculations to the law and to the testimony, and by this important test learns to distinguish the dross from the pure ore. No reader can rise from the perusal of his "Bible Biography," without feeling wiser and better; and nothing short of a careful examination can make him acquainted with the intrinsic value of the author's laborious researches. The serious inquirer after divine truth, and the humble Christian, who, laying aside fruitless controversy, is anxious to advance his own spiritual education, will hereby be instructed, confirmed, and comforted, "in the way of righteousness." In short, we are here taught, by faith, to enter an unseen world, to penetrate beyond the grave, to gather indubitable assurances of an hereafter, and to perceive the majesty of a soul possessed of immortality.

The design of the present volume is to point out the proper improvement of the inspired history, many parts of which may appear to common readers dry and uninteresting; and to offer such reflections upon the various occurrences as a pious mind would wish to indulge. To this end, throughout the whole of the sacred narratives, great plainness of speech is studied, curious researches are avoided, nor is any *new* information aimed at. Those evangelical doctrines which have been generally received in the Christian church are taken for granted, and a practical application of them is addressed to persons of different descriptions. Neither the limits nor the intent of the work would have permitted a labored defence of each truth therein advanced. And, perhaps, after all the controversial writings with which the world abounds, the important purposes of religion will be more effectually promoted by solemn and earnest exhortations, grounded on acknowledged principles, than by the most ingenious and solid arguments in vindication of even the purest creed. The latter, indeed, may be highly useful, as conveying light to the understanding, and conviction to the judgment; but the former, in general, have a more powerful influence upon the will and the affections, and are therefore more conducive to practice. One delightful feature of the present work is *its extreme cheapness*: here is a large and handsome octavo, of five hundred pages, bourgeois type, with several hundred fine engravings, handsomely bound in gilt and lettered, afforded at a very low price. It comes within the means of many hundreds of plain people; and what a mass of precious Biblical instruction does it contain! Surely, every Christian parent will be pleased to purchase it. A more suitable present could not be given to a family

We might enlarge much upon the benefits that would result, to the young especially, from the study of Sacred Biography. It is presumed, however, that these are self-evident to every reflecting mind; *all* will admit that it does at once engage the mind, by the variety of remarkable incidents and characters which it brings into view. Nor is it the least considerable recommendation of this study, that it seems particularly calculated to promote SELF-KNOWLEDGE. By looking at the excellences of others, we are convinced of our own duty, and our sad declensions from it, much more forcibly than by the mere reading of dry precepts and directions. After all, however, that is said upon the object and merits of this new work, it must be seen and studied to appreciate its importance and beauty. And, in conclusion, we heartily recommend this book, as a very valuable, cheap, and convenient one for family reading. The price places it within the reach of every clergyman and of almost every layman. This volume will, we are persuaded, be found a great help to a just and ready understanding of the Sacred Scriptures.

From the New York Union Herald.

We are satisfied that very culpable negligence prevails in many families respecting the character of the books and papers which are read by children, apprentices, &c. That the most mischievous and corrupting sentiments are oftentimes inculcated in books with innocent titles and highly attractive illustrations, we need not say. Such, however, is not the case with the new and beautiful volume on the Bible just issued, and for sale at No. 122 Nassau-street. It is a work of eminent merit, well adapted to the purposes of family instruction; and we consider it greatly superior to any work now in use for family reading. The five hundred engravings alone are well worth the price of the book. On the whole, it will give complete satisfaction to all classes of readers—the young, the old, the ignorant and the enlightened. We recommend all our young men to procure Mr. Sears' "Bible Biography," and we advise parents to procure it for their sons and daughters.

From the Reading, Pa. Gazette.

This new and valuable work has just been placed in our hands for examination. It is intended as a "Christian Father's Present to his Family," and indeed we know of no work that would prove a more appropriate and valuable addition to the family library.

From the St. John (N. B.) Morning News.

It is not the purpose of a journal like the "Morning News," to enter upon a formal or lengthy review of a work like the present. But still, after turning over the pages of this large and beautiful volume, we cannot consent to pass it by without some more lasting and tangible memorial to the high value, not only as well written biographies, but also as a repository of a vast amount of Biblical knowledge, valuable in the parent, teacher, and scholar. The information of the Assyrian, as of the most authentic documents, and has, evidently, been compiled and condensed with great care. Lists of the kingdom of Alexander, Tyrone, and Napoleon! Let a Christian public, in every place, contemplate the lives and characters of all the principal "actors" mentioned in the Sacred Scriptures. Here are to be found, in reality, authentic representations of many heroes in the field of state "actors" mentioned in the "holy wars" against the principalities and powers of carnal and world darkness. The personal sketches, which attempt to the memory, earth, and have bravely sealed the pomp and pageantry of battle, and show, amid the shouting plaudits of the crowd, with a certainty that his valor and deeds are to be heralded through the universe, one day, and yet perhaps for him of true moral courage than the Christian martyrs, who is called daily to witness among the humble walks of Africa, or amid the snows of Labrador—among the habitations of men in towns of our own country. But how different is the estimate of the world! How will an admiring population—and those actions or parts of the case who gazed for life to have the life of his fellow-man, when, at the same time, the younger of the humble and retiring Bible character, who encountered hunger and cold in the north, and heat and thirst in the south, and have given his life cheerfully in the cause of his MASTER, as either unknown, or unheeded! But the lessons of the one will fade in the end—the immortal gems of the other—never.

But we digress from our purpose.—We have no hesitation in saying, that Mr. Sears' work is the best of the kind we have examined. We consider it an exceedingly valuable one, not only to ministers, and teachers of Christian schools, but to Christian generally. It contains a vast amount of information, of which every family who can afford it should be in possession. The work is, in all respects, of superior execution. The five hundred and two original engravings are finely done, and add not a little to its intrinsic value, as well as the ornament of the book. As the leading papers of the day speak of it in the strongest terms of approbation.

From the Philadelphia Daily Ledger.

An interesting volume with the above title has just been published by Mr. Robert Sears, of New York, in which we find the lives and characters of the principal personages recorded in the sacred writings, written out in a clear and comprehensive manner, and illustrated by several hundred engravings, historical and landscape, executed in a very superior style, by American artists of the first character. The work is a large octavo volume of about 600 pages. It is a complete repository of Biblical knowledge, carefully condensed and compiled from the most learned authors on the Scriptures. It may be really recommended as a class medium through which the great events of Scripture may be lastingly impressed upon the minds of youth, and for that reason is admirably suited to every household.

From the St. John (N. B.) Herald.

Some few weeks since we announced the arrival of this work in our city, intending to take an early opportunity of again referring to it, and going more minutely into its merits. After a careful perusal of its contents, we are now prepared to say, that this volume has fair to be most popular—permanently popular, we mean,—from any of its prior's literary productions; and that is saying much. We go a step further—that is one of the most interesting and instructive, and at the same time religious and instructive works, we have for a long time had the pleasure of meeting. There is another considerable recommendation of this work, that there is nothing in it which can offend the most exclusive, the most orthodox, or the most pious persons, whether sound churchmen or dissenters, for the whole work we cannot discover the least inclination to favor any one particular denomination; on central subject are the expositions, and so calculate in the spirit of the editor, that it would be impossible to fall to what sect he belonged, because. We continued, from a source that may be relied on, that the stereotype plates and engravings alone, cost the publisher one eighth; but we believe that the care and pains which he has bestowed in compiling the volume work, and the correct style in which it is done, must secure it a favorable reception among all classes. The volume is well adapted to promote the interests of spiritual religion.

From the St. John (N. B.) Weekly Chronicle.

Mr. ROBERT SEARS, of 100 Nassau street, New York, has issued his promised work, entitled "Bible Biography." On coming over its 600 pages, with some care to the unusual but scriptural conversions, we are gratified with the matter of the volume, and the elegant style in which it is printed and bound. With the editorial property the work may be called "The History of the Bible." The preparation of such a book has, doubtless, been a great and expensive undertaking, requiring much thought, experience, and patience. Evidently the editor has had recourse to the best compilers, critics, and commentators; and the volume throughout is dark with the light of our blessed Lord and Saviour—every page being replete with evangelical truth and doctrine—appear beautiful and instructive, of which it is hoped the reader will make a right use and this improvement.

The style, or language, of the whole volume is such as to render it agreeable to unclean and intelligent readers. The practical reflections will have considerable, and are purely spiritual, while there is much that throws good light upon some of the obscure passages in the Old Testament, with which we are furnished in the New. The history of the Saviour's sufferings, death, and resurrection, is full, and beautifully illustrated with numerous engravings of a superior character. And, indeed, throughout the whole work, the author appears to have labored every for the object in view—to render the "Bible" uniformly evangelical. We trust that the new attempt to bring devotional knowledge in a convenient popular form, will meet with general approbation, and that this work will be found extensively useful in Christians of all denominations.

The composition or literature of the volume is out of that common place and common sort, with a dry detail of facts and events. The writers of biographies ought to be gifted, original thinkers, capable of tracing remote causes in the formation of character, and keeping in view the genius of the formation and development. The "Leaves of Scripture Character" before us are valuable, as exhibiting in a good degree, the spirit of talent in sacrificial character, and showing what were its constituent principles, and how it is formed. There is, moreover, in the book itself an general character of excellence. The spirit of piety which it breathes is of the essential, pious kind; sincerely lively and winning; while it is also sufficiently dignified and instructive. In conclusion, we cannot carefully commend this heavenly volume to all, our readers, and especially to Christian parents and teachers, as being well adapted to promote their present and future happiness.

From the Poughkeepsie Telegraph.

Among the multitude of books, as various in their character as in their external appearance, which constantly issue from the press, it is pleasant to point to one of real value, and know that we are calling public attention to a work not only unexceptionable in its letter and spirit, but salutary in its tendency and influence. Such is the book to which we would now direct the attention of our readers. This work contains a series of biographical sketches of the most distinguished men mentioned in the Scriptures, from Adam to John the Baptist, with a sketch of the human life of the Redeemer, and dissertations on the fulfilled prophecies, and other matters highly interesting to the Christian; the whole illustrated by about five hundred engravings, many of them beautifully executed. It is handsomely bound in cloth and gilt, and sold at a very low price.

Having examined this work carefully, we do in all sincerity recommend it, believing that it will exert a happy influence in every family circle where it may find its way. It is conceded that biography is one of the most pleasing, and, at the same time, instructive modes of making the young mind acquainted with the character and history of man; for, while it unclasps the volume of grave history, and spreads its varied contents out to view, it "holds the mirror up to nature," and reflects the image of the great and the ignoble, the good and the evil, the wise and the foolish of our species, as exemplars for imitation, or as warning beacons by which we may perceive and avoid the many dangers that lie beneath the surface of society, and on which so many youthful souls have been wrecked. The virtues of the patriarchs, prophets, and sages, which illuminate every page of the Sacred Record, cannot be too closely studied and imitated; and every father, if he is wise for himself and for his children, will not neglect to make the study of such shining examples a part of his child's education. The work before us exhibits a brilliant galaxy of such exemplars, and while the text, recording their virtues, purifies and ennobles the heart, the pictorial illustrations, elucidating every ambiguous passage, enlighten and enlarge the understanding. For this happy combination of influences, effected by the taste and liberality of Mr. Sears, he deserves sincere thanks and pecuniary reward; and we hope that he may receive both, with full measure.

From the Presbyterian.

The title of this book is so full and descriptive, that the reader will want little more to introduce him to a knowledge of its contents. In the Scriptural Biography there is interspersed a great amount of information respecting Eastern customs, and the dissertations are valuable for their argument on the most momentous topics. The wood-cuts are very numerous, and generally very well executed, although sometimes they seem to be stuck in rather for embellishment than illustration of the text. Altogether the book is a beautiful and attractive one, and young persons will be particularly pleased with it, as its instructions are so often relieved by what charms the eye.

From the New York Gazette Extraordinary.

This is indeed a book for every family, illustrated with several hundred new and original engravings, designed and executed by the most eminent artists of Europe and America. This work is worthy of all praise; and must meet the expectations and wants of every serious reader. The conception and arrangement of the work are admirable; and as far as we have had an opportunity of judging, the typographical execution of it equals the plan. We have read various parts of it attentively; and while we have not met with any thing which we could wish to have been omitted, most sincerely can we say that we have found much to edify and amuse, and well calculated to inspire and sustain true religion in the heart. Nor can we refrain from expressing our persuasion that Mr. Sears' "Bible Biography" is well suited, under the divine blessing, to encourage and promote practical Bible religion, not only in the domestic family circle, but throughout the land; and thus to advance the general interests of Scriptural religion. We hope the volume will find a ready welcome in all Christian families at least; and that the number of such families may be increased by the circulation and perusal of this invaluable work on the Bible.

From the United States Literary Advertiser for June, 1842.

This is a work of great attraction and value. This volume must find a welcome at every fireside throughout the country; its contents are as interesting as they are important and instructive, and the judicious and talented author has here contrived to present us with one of the most attractive, and, at the same time, useful books that has ever appeared this side the Atlantic. We trust the public will reward its enterprising publisher.

From the New World.

The engravings, from new and original designs, are well executed. The design of the work is excellent, and we cheerfully recommend it to the notice of our readers.

From the New York Tribune.

This is a very valuable, cheap, and convenient book. The public will soon find it one of the books they must have. May the publisher supply the land with many ten thousands.

From the Baptist Advocate.

We cheerfully commend the book to the readers of the Advocate, as a work of much merit, furnished at a very cheap rate

From the Boston Transcript.

Altogether it is one of the most elegant works of the season, and must prove the most useful ever issued from the American press.

From the Boston Daily Mail.

We cordially recommend this excellent book.

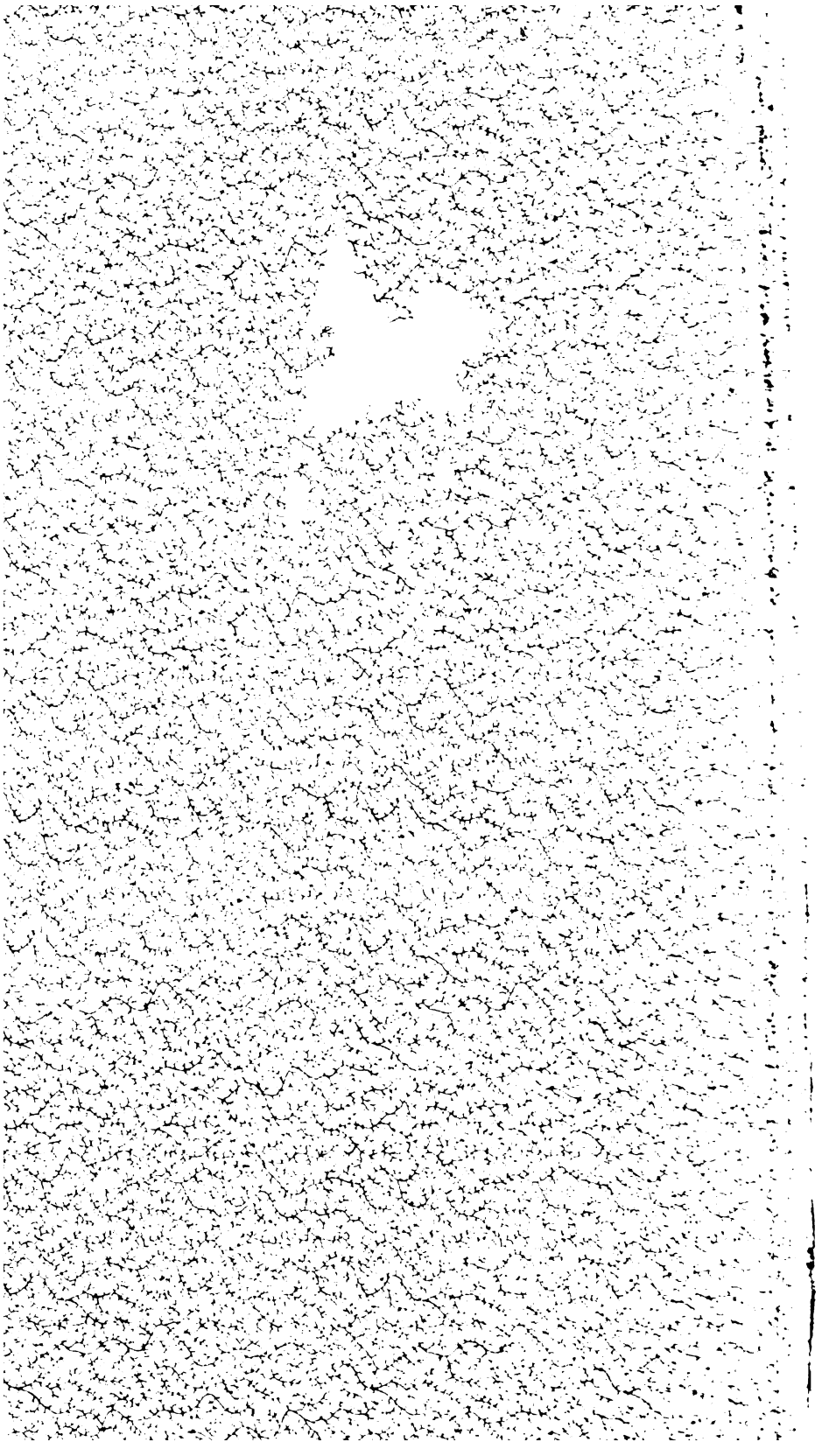
From the Boston Daily Bee.

An elegant work of five hundred pages, and containing about five hundred engravings. The contents of the volume appear to be sound, judicious, and interesting.

☞ Persons in the country would do well to procure a subscription book, and obtain at once the names of their friends and acquaintances, at least, as subscribers to this invaluable literary gem. Will each agent or friend who complies with this request, have the kindness to inform the publisher how many copies will be wanted for his neighborhood, by mail, (*post-paid*,) as soon as possible? It is his intention to spare neither pains nor expense to introduce this entirely new and original volume into every family throughout the Union.

☞ The above will be found one of the most useful and popular works ever published, for enterprising men to undertake the sale of in all our principal cities and towns.

☞ No letter will be taken from the post-office unless the postage is paid. Persons remitting money through the post-office will be careful to pay the whole postage.

Robert Sears,

Editor and Publisher, 122 Nassau Street, New York.